HEWLETT PACKARD

LaserJet III Printer User's Manual



LaserJet III Printer
User's Manual

HEWLETT PACKARD

HP Part No. 33449 - 90901
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What You Can Learn From This Manual

This manual introduces you to the LaserJet III printer: its features, operation, maintenance, and troubleshooting. This manual provides information for both first-time users of our laser printers and those already familiar with previous models of HP's laser printers.

Printer set-up and installation instructions are provided in *Your Guide to Setting Up Your LaserJet III Printer.* This document leads you through unpacking your printer, attaching the power and communication cables, and configuring it for operation with your PC (or other computer system). Make sure you have successfully set up and configured your printer before using the features described in this manual.

For First-Time Users

This manual tells you how to operate and maintain the LaserJet III printer. You will also learn:

- how to use your software application packages (such as word processing or spreadsheet programs) to access many of the LaserJet III printer's powerful features
- how to use fonts with your printer
- how to use the printer control panel to manually select and set printer options.

For Experienced Users

Read this manual for review and to learn about the LaserJet III printer's many new features. The operation of the control panel keys and indicators is similar to the LaserJet series II and LaserJet IID models; however, there are differences in both the range and sequence of control panel selections. The *LaserJet III Printer User's Quick Reference Guide* provides tips on using your software with the printer, preventing and correcting printer problems, and ordering supplies.

Where to Look For Help

Following is a topical overview of this manual's content and organization:

Finding information in the manual

Following this introduction is the *Table of Contents*. This is a guide to the manual's topics in the order of their appearance. An alphabetical *Index* to the subjects is provided at the end of the manual.

Learning about your printer

Chapter 1, *Your LaserJet III Printer*, provides an introduction to the printer features, accessory products, and an overview of key printer components.

Using scalable typefaces, fonts and software

Chapter 2, *Putting Your Software to Work*, shows how to use your application software to accomplish common printing tasks. Chapter 3, *Using Type*, is an overview of scalable typefaces and fonts and how they are used by the printer.

Operating the Control Panel

Chapter 4, *The Control Panel*, describes the function and operation of the keys, indicators, and option menus.

Special-purpose tasks

Chapter 5, *Special Printer Operations*, shows how to use different sizes of paper, print on special media (labels and transparencies), and produce reverse-order output.

Taking care of your LaserJet III printer

Chapter 6, *Cleaning and Maintenance*, and Chapter 7, *Troubleshooting*, explains cleaning and caring for your LaserJet III printer, and how to fix occasional problems such as paper jams and poor print quality.

Service information

Chapter 8, *Service and Support*, provides information you should know if your LaserJet III printer ever needs repair.

Technical summaries and reference material

The *Appendixes* provide:

- tables and summaries of technical information (symbol sets, printer command sequences) you will need for some printing tasks.
- environmental and safety specifications.
- guidance in purchasing and using paper, labels, overhead transparencies and envelopes most effectively.
- instructions for installing additional memory
- I/O interface and cabling instructions.

Related User Information

The *LaserJet III Printer User's Manual* contains information on using most of the printer's common features. If you need additional copies, order HP part number 33449-90901. The *LaserJet III User's Quick Reference Guide* is included with your order.

The related documents provided with your printer contain information such as how to install and configure your printer and notes on using the printer with the more popular software packages.

Your LaserJet III printer comes with:

- *Your Guide to Setting Up Your LaserJet III Printer* – Leads you through the successful set-up and configuration of your printer. Read it first! (HP part number 33449-90905)
- *LaserJet III Printer User's Quick Reference Guide* – Included with your manual, provides speedy access to page formatting commands, common error messages, control panel usage, typefaces, maintenance, and supplies and accessories for your LaserJet III printer.

- *LaserJet III Printer Envelope Tray User's Guide* – Provides instructions for using the optional envelope tray, with tips on using common software applications to print envelopes. (HP part number 33449-90935)
- *Software Application Notes* – Contains information on using your LaserJet III printer with some of the most popular software packages. Copies of individual application notes are available by calling HP's Personal Peripherals Assist Line at (208) 323-2551.
- *Supplies and Accessories* brochure – Contains descriptions and ordering information for items such as toner cartridges, envelope trays, paper trays, scalable typefaces, fonts and memory.

You can also order the following manual from HP's Direct Marketing Division:

- *LaserJet III Printer Technical Reference Manual* – Explains the PCL 5 printer language for experienced users and programmers. Order HP part number 33449-90903. A *Technical Quick Reference Card* for the *LaserJet III Printer Technical Reference Manual* is included with the manual.



You can order additional copies of the manuals from Hewlett-Packard's Direct Marketing Division by calling (800) 538-8787 toll free or (408) 720-2428 direct. (In Canada call (416) 671-8383. In the United Kingdom call (0734) 441212. In West Germany call (0130) 3322.)

Customer Support

Chapter 8, *Service and Support,* details the types and sources of support available for your printer. These vary according to the questions you have about your printer's operation, your service contract (if any), and the local dealership where you purchased your printer. It is usually best to contact your internal support organization (if offered by your company) or the place of purchase before calling HP.

Many common questions and problems can be resolved by referring to the information in Chapter 7, *Troubleshooting,* which includes a list of commonly asked questions. Reviewing this material before you call for service or assistance helps isolate the problem more quickly and often saves you both time and money.

Conventions

This manual uses the following conventions:

Bold indicates a term defined in the glossary.

Italic refers to a related document, or is used for emphasis.

COMPUTER type indicates text visible on the printer display or commands as seen on a PC terminal.

The cursive letter ℓ is used in examples to distinguish the letter **l** from the numeral **1** (one).

[Keyface] indicates one of several keys (such as [Menu]) on the printer control panel or on your computer keyboard.

Note



Notes contain important information set off from the text.

Caution



Caution messages appear before procedures which, if not observed, could result in loss of data or in damage to equipment.

Warning



Warning messages alert you to a specific procedure or practice which, if not followed correctly, could cause personal injury.

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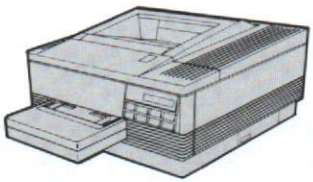
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1

Your LaserJet III Printer

Printer Features

Advanced Technical Features



The LaserJet III printer provides the quality and reliability of Hewlett-Packard printers as well as these specific features:

- Resolution Enhancement™ – An HP innovation that sets a new standard of print quality for 300 dots-per-inch (dpi) printing.
- Scalable typefaces – The LaserJet III printer features **scalable typefaces** for generating fonts of any desired point size up to 999.75 points in quarter-point increments. Eight proportionally spaced scalable typefaces and fourteen bitmapped fixed-pitch fonts are internal to the printer.
- PCL5 Printer Language, featuring commands for:
 - fully integrated HP-GL/2 vector graphics support.
 - advanced imaging capabilities. Provides access to many special effects such as white-on-black printing and patterned fonts
 - multiple print directions on the same page.
 - compatibility with software that supports the LaserJet series II printer.
- Auto rotation for fonts and raster graphics. Print images rotate automatically as you rotate the page orientation.
- Extensive range of control-panel selectable symbol sets.
- Printer messages displayed in your choice of five languages: English, French, German, Italian, or Spanish.
- Two font cartridge slots.

- One Mbyte of base RAM memory (720 Kbytes are user accessible) with optional memory upgrades of 1 to 4 megabytes.
- Macro cartridge support for forms generation.
- Serial and Centronics parallel interfaces.
- Optional I/O slot accommodates a variety of hardware interfaces such as print spoolers.

Operating and Maintenance Features

- Quiet and fast – The LaserJet III printer quietly prints high-quality output up to 8 pages per minute*.
- Wide range of media sizes and types, including envelopes, labels, and overhead transparencies.
- Easy to use control panel for printing selections and configuration.
- Simple maintenance procedures to keep producing high-quality documents.
- Toner cartridges that are easy to insert and replace.

* Actual print speed depends on how complex your data is and how efficiently your software handles that data.

Optional Accessories

Here are some of the options available for the LaserJet III printer:

- Memory Boards – Add 1 or 2 megabytes of additional memory (HP part numbers 33474B and 33475B, respectively) in combination to produce 1 to 4 megabytes of extended memory. (See Appendix E of this manual for memory board installation instructions.)
- Extensive scalable typeface and bitmapped font collections to enhance your printing needs
- *Type Director* utility:
 - ☐ installs accessory type and soft fonts.
 - ☐ provides enhanced screen font fidelity.
 - ☐ features sophisticated type and font management.

- Postscript* and IBM Proprinter/Epson FX printer language cartridge accessories provide versatile printing solutions for every environment.
- Paper Input Trays – The letter-size ($8\frac{1}{2}$in. x 11in.) paper tray holds up to 200 sheets of 20# paper and is standard with the LaserJet III printer. You can order additional paper trays for letter, legal, executive, and A4 sizes, and for envelopes.

To order these options or any of the accessory products for your LaserJet III printer, see the *Supplies and Accessories* brochure included in the printer box. You can also order accessories by calling Hewlett-Packard's Direct Marketing Division (see page *vii* for the telephone numbers in your location).

Compatibility with Previous LaserJet Printers

The LaserJet III printer is fully compatible with previous models of LaserJet printers in the following respects:

- The PCL5 printer language is compatible with previous versions and supports the commands contained in those versions.
- The LaserJet III printer supports all existing HP font cartridges and soft fonts.
- The LaserJet III printer uses the same EP-S toner cartridge as the LaserJet series II and LaserJet IID printers.
- Paper and envelope trays that work with your LaserJet series II printers also work with the LaserJet III printer.

Note



Optional RAM expansion cards that worked with your LaserJet series II or LaserJet IID printers will *not* work with the LaserJet III printer. Use only HP part number 33474 or 33475, revision "B" or later.

Internal Type Offering

The LaserJet III printer includes 8 proportional scalable typefaces in CG Times and Univers and 14 fixed-pitch bitmapped fonts in Courier and Line Printer. See Chapter 3 for an explanation of the differences between scalable typefaces and bitmapped fonts and when to use each.

Other Type Sources

In addition to internal scalable typefaces and bitmapped fonts, HP's font cartridge and soft font products contain an extensive range of both scalable typefaces and bitmapped fonts. Refer to the most current *Supplies and Accessories* brochure for a list of accessory typefaces and fonts.

Your LaserJet III Printer Parts

The following three illustrations show the important parts of the printer. Spend a few minutes reviewing the illustrations so that you know their location before you start to use the printer.

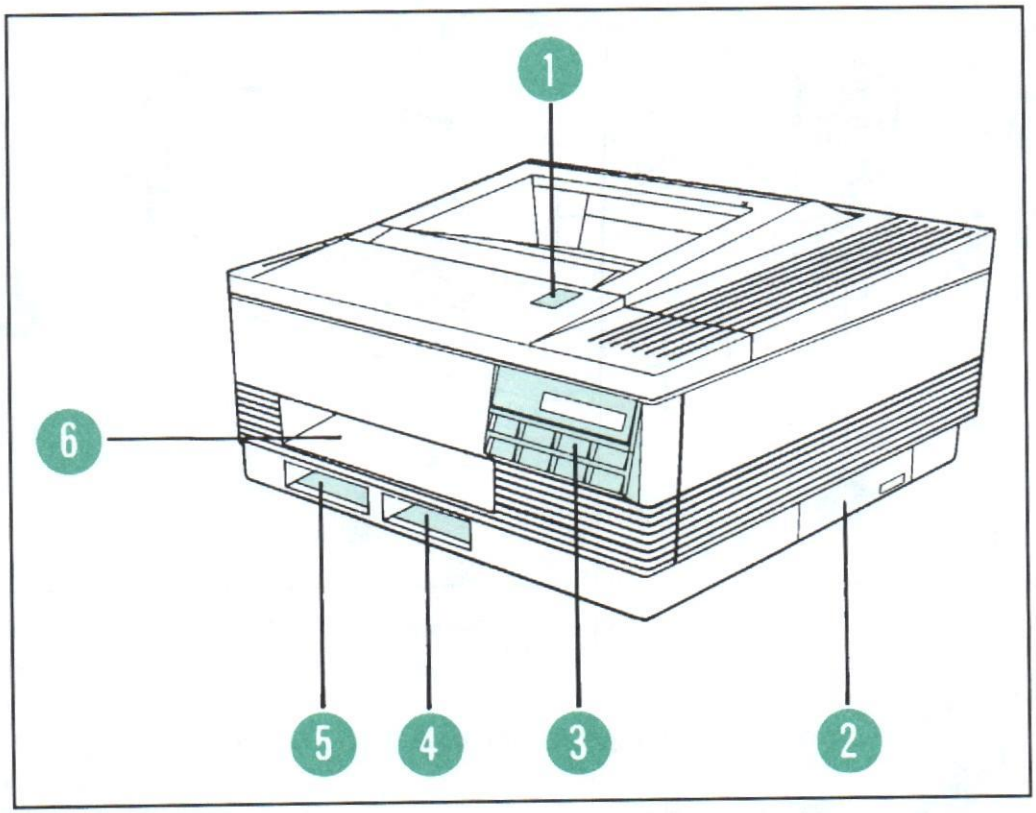


Figure 1-1. LaserJet III Printer (front and right side view)

1. Top release button
2. Test print button
3. Control panel
4. Right cartridge slot
5. Left cartridge slot
6. Paper tray slot

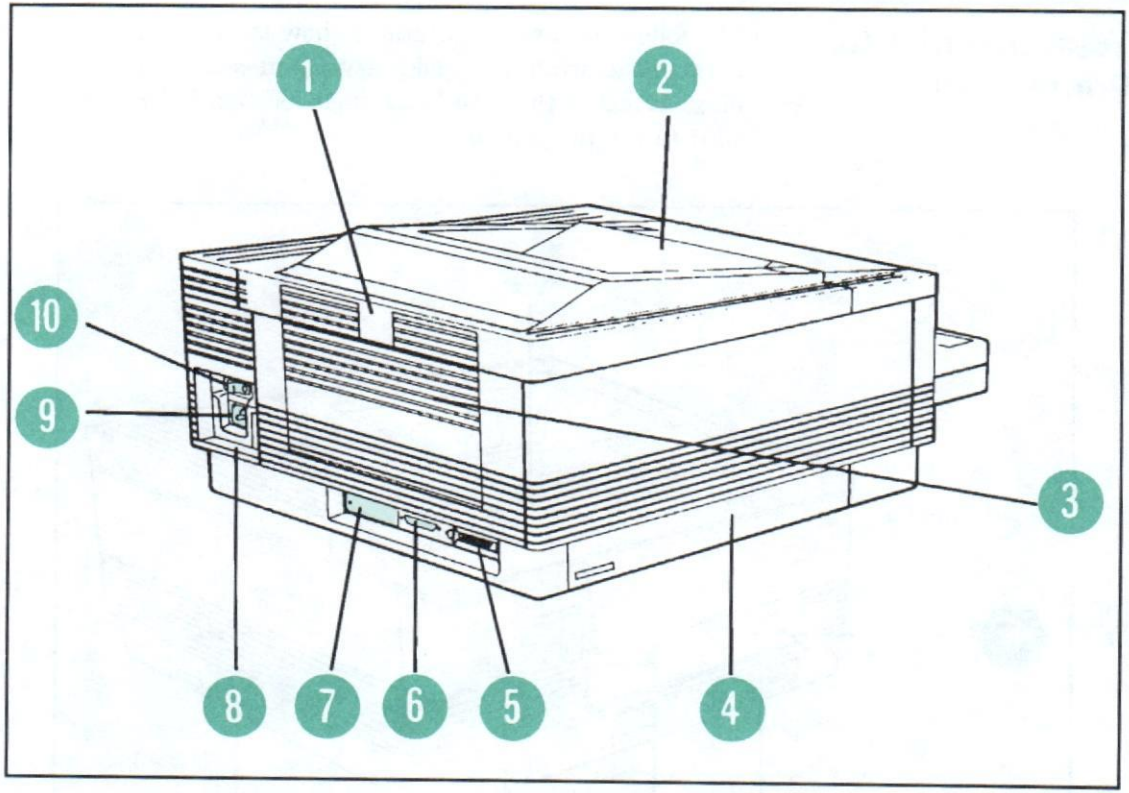


Figure 1-2. LaserJet III Printer (rear view)

1. Rear output tray press-and-release latch
2. Top output tray
3. Rear output tray
4. Optional memory slots (RAM expansion)
5. Parallel port
6. Serial port
7. Optional interface slot
8. Serial number
9. Power connector plug
10. ON/OFF power switch

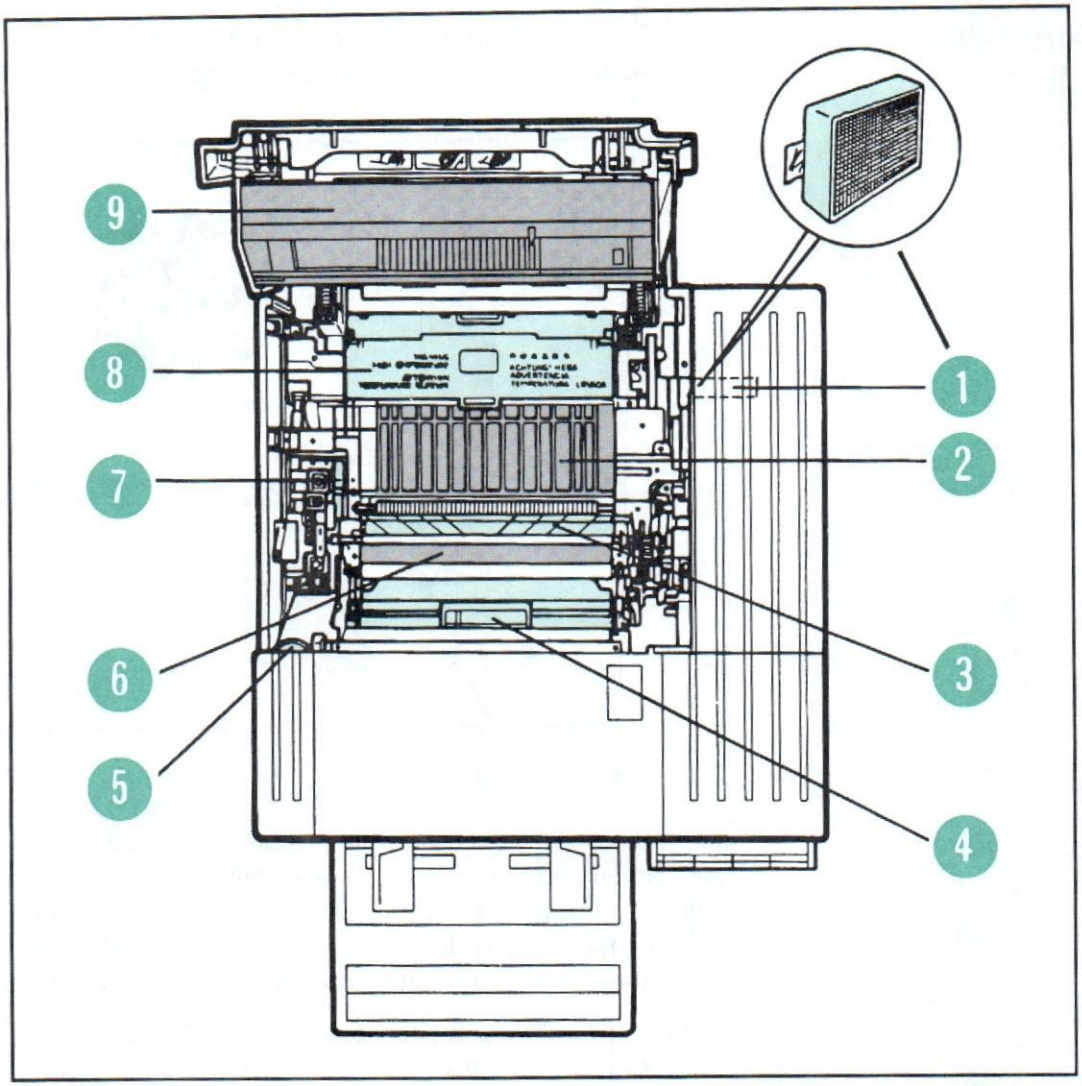


Figure 1-3. Inside the LaserJet III Printer (top view)

1. Ozone filter
2. Paper feed guide
3. Transfer corona wire
4. Transfer guide lock tray
5. Print density dial
6. Transfer guide strip
7. Cleaning brush
8. Fuser assembly
9. EP-S cartridge

Controlling Your Printer

Your LaserJet III printer allows you to use software, printer commands, or the front panel to control how it prints.

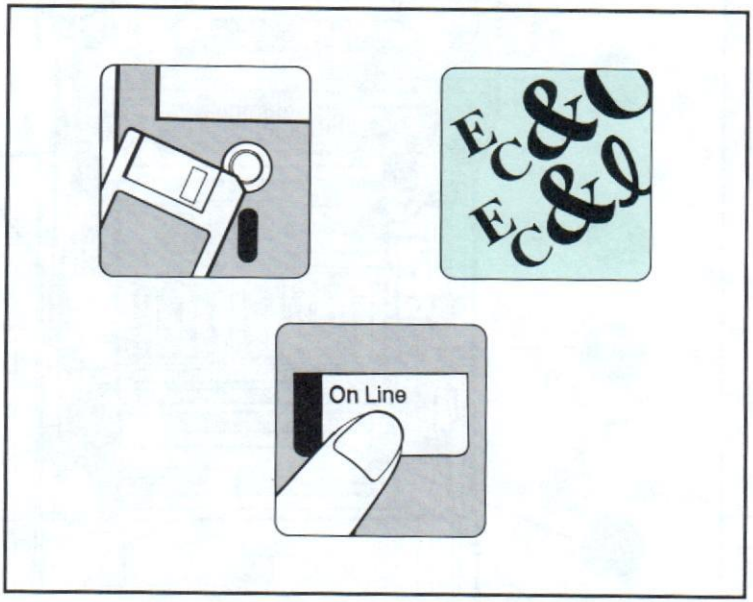


Figure 1-4. Three Ways to Control Your Printer.

The easiest way to control your printer is by using your software application. Most software applications allow you to choose printing instructions from a menu or enter printing instructions directly in your file. The application translates these instructions into commands for the printer.

With many software applications, you can also enter printer commands directly in your file. However, this method of controlling your printer requires you to learn printer commands.

You can also control your printer by pressing keys on the control panel to select items, such as the font and number of copies. However, if you are sharing the printer, other

users have to check, and possibly change, the settings on the control panel before each printing task.

Note



Remember software settings always override control panel settings.

Maintaining Your Printer

Simple, routine cleaning is necessary to ensure continued print quality and a long life for your LaserJet III printer. Regular cleaning also minimizes service costs. A neglected printer will result in degraded print quality, increased paper jams, and potentially may cause damage requiring a service call.

Refer to Chapter 6, "Cleaning and Maintaining Your Printer," for guidance on keeping your printer clean.

Printer Set-up Sheet

Please take a few moments to answer the questions on this sheet. If you have questions for your dealer or HP's Personal Peripherals Assist Line, the following information will help answer your questions more quickly.

LaserJet III Printer Set-up Information Sheet

What is your printer serial number? (Located beneath the power connector plug)	
What brand and model of computer are you using?	
What operating system (DOS, UNIX, etc.) and version are you using?	
What cable are you using and where was it purchased?	
Is the printer connected to a serial or a parallel port?	
What software package and version are you using?	
Are you using cartridge or soft fonts? If so, what part number?	
What software printer drivers have you selected?	
Are you using any special equipment or software?	
Are you using a spooler or sharing device?	
Is your computer on a network?	
Are you using switchboxes or modems?	
Are you using special interface or RAM boards?	

2

Putting Software to Work



The easiest way to control your printer is by using a software application, such as a word processor, spreadsheet, or database report generator. *Software commands always override control panel Printing Menu selections.*

Using software, you save time and effort, control your output, and avoid manually changing control panel settings for each new print job.

For Experienced Users

Using software with your LaserJet III printer is the same as for other LaserJet models. You may find it helpful to review this material, however, to refresh your understanding of how your software uses printer commands when sending data to the printer.

How Software Works With the Printer

Typically, you print using a software package, such as a desktop publishing or word processing system or a spreadsheet.

Software packages send information that selects and controls printing features in different ways. Some packages, such as Microsoft Word® and WordPerfect,® use drivers. **Drivers** are files that control the operation of the printer and allow your software to access its features. You often do not see the printer commands directly with these types of packages; the software sends them to the printer for you. Using some packages, you enter printer commands in initialization or set-up strings. Still others require you to enter printer commands directly in your files.

Because most printing problems stem from the way your software and the printer interact, learn how your software works with the printer. If you have trouble and suspect that it may be software related, please contact your software supplier for information on using your package with the printer.

Software that Uses Drivers

Drivers are programs that allow your software package to send page set-up commands to the printer. They work automatically so that you do not have to enter the commands yourself. Drivers allow you to select margins, change fonts, and select the number of copies from menus or by using function keys.

Most software drivers support many different printers and a range of common hardware configurations. If your software package has a driver for the LaserJet III printer, it will know what commands to send to the printer to carry out the tasks you request.

The following figure shows a sample menu that uses a driver to send printer commands to the printer:

```
Print Format

     1 - Pitch                          10
         Font                           1

     2 - Lines per inch                 6

  Right Justification                   On
     3 - Turn off
     4 - Turn on

  Underlining Style                     5
     5 - Non-continuous Single
     6 - Non-continuous Double
     7 - Continuous Single
     8 - Continuous Double

     9 - Sheet Feeder Bin Number        1


     A - Insert Printer Command

Selection: 0
```

Figure 2-1.
Some Selectable Printing Options
Using Software Drivers

You select the printing options from the menu. Your software then sends the proper commands to the printer.

Some common software packages that use drivers to communicate with the printer are:

- Aldus PageMaker™
- Microsoft Word
- Multimate Advantage II™
- WordPerfect
- Wordstar 2000 Plus® Release 3

Software That Uses Set-Up Strings

Some software packages require you to enter printer commands in initialization or set-up strings. You combine and enter the printer commands in a menu or screen. The set-up string goes to the printer first, before any other data. Some software packages that use set-up strings also allow you to embed printer commands in your file. Refer to "Software that Uses Embedded Printer Commands" later in this chapter (or see Appendix B for a complete listing of commands).

A screen where you enter a set-up string may look like this:

```
A1:                                                              EDIT
Enter Setup String:\027E

    A        B        C        D        E        F        G

1                              SOUTH SEAS SHIPPING COMPANY
2                               MONTHLY SALES TRANSACTION
3                                     BY CUSTOMER
4
5     CUSTOMER NUMBER: 705
6     CUSTOMER name: Manhattan Exports, Ltd.                    Representative
7
8     Product#     Quant      Unit Price     Ext. Price     Cost
9     ------------------------------------------------------------------------
10    CX3000         15         $1,800.00      $27,000.00     $1,530.00
11    P83040         15         $2,250.00      $33,750.00     $2,175.00
12    PX3050          5         $3,000.00      $15,000.00     $2,350.00
13    P89030          8         $3,000.00      $24,000.00     $2,300.00
14    MX3010         10         $1,700.00      $17,000.00     $1,630.00
15    ------------------------------------------------------------------------
16    Customer
17    Totals         53       $116,750.00
18
19

                                  Num Pad
```

Figure 2-2. Set-Up String Example

Software usually limits the length of set-up strings. Refer to "Combining Printer Commands" later in this chapter for ways to shorten the length of your set-up string.

Software packages that use set-up strings to communicate with the printer include:

- Lotus 1-2-3®
- Quattro
- Symphony®
- Wordstar 3.3®

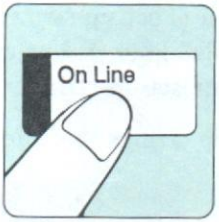
For information on using set-up strings with an application such as Lotus 1-2-3, refer to the *Software Application Notes* included with your printer.

Software Utilities

A few software packages do not let you send printer commands directly. In such cases, you can often use a software utility designed specifically to control printer output.

Some software utility packages for controlling printer output are:

- LaserControl
- Printworks for Lasers
- RAM Resident Printmerge
- MacPrint™ (MacIntosh)



LaserJet III Printer Control Panel

If you don't have software applications or a utility to control printing, you can use the printer control panel to do the following:

- Select number of copies
- Select a font for printing
- Select pitch and point sizes
- Select paper or envelope size
- Select page orientation
- Set the number of lines to print per page
- Select manual feed
- Select a symbol set

Refer to Chapter 4, "Using the Control Panel," for more information.

Software That Uses Embedded Printer Commands

Some software packages let you enter printer commands anywhere in your file. Figure 2-3 shows an example of embedded printer commands. (The commands are highlighted.)

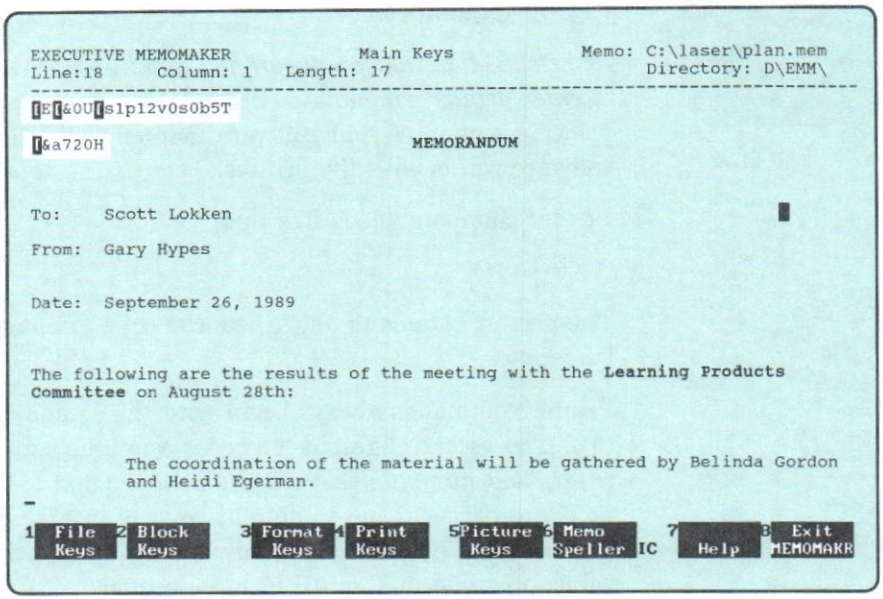
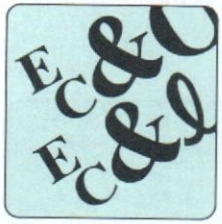


Figure 2-3. Embedded Printer Commands

Some common software packages that use embedded printer commands to communicate with the printer are:

- Executive MemoMaker™
- Lotus 1-2-3 version 2.01
- Wordstar 3.3

What are Printer Commands?



Printer commands tell the printer which tasks to perform or fonts to use. Once you know how your software works with the printer, you can enter printer commands indirectly by making software selections, or directly in set-up strings or the text of your file. Printer commands are also called **escape sequences.**

Remember that many software packages do not require you to enter printer commands. Before going on, look in the printing section of your software manual to see how your software works with the printer .

Printer commands look like this:

$^{E}_{C}$&ℓ1O

The printer command above sets the page orientation to landscape.

Printer commands always begin with the escape character ($^{E}_{C}$). The escape character precedes a unique series of letters and numbers that tell the printer what to do. Software packages have different ways of inserting or representing $^{E}_{C}$, most commonly by its numeric character value: 27 in decimal or 1B in hexadecimal.

Most printer commands have a value field for which you must supply a number. This number can be a literal value, such as 12.00 for point size, or a representative value, as in the above example, where **1** signified landscape orientation. In this text, a # within a printer command means you should enter a number for the quantity or value you want in place of the # sign.

All printer commands end with an uppercase letter or a special symbol (such as @).

Note



Printer commands are *case sensitive.* Make sure you enter uppercase and lowercase letters correctly.

Figure 2-4 displays the elements of a page orientation printer command.

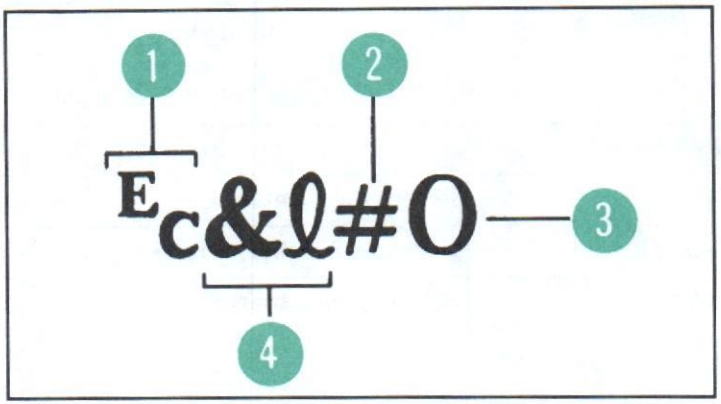


Figure 2-4. Printer Command Explanation

1. Escape character
2. Value field
3. Uppercase letter that terminates the escape sequence that follows.
4. Notifies printer of the type of command

Note

Before using printer commands, compare these characters:

Lowercase l:	ℓ	Uppercase O:	O
Number one:	1	Number 0:	ø

Many printer commands use the lowercase letter l (ℓ) and the number one (1), or the uppercase letter O (O) and the number zero (ø). These characters may not appear on your screen as shown here.

Commonly Used Printer Commands

The table below lists some of the commonly used printer commands. Appendix B provides a complete list of printer commands.

Table 2-1. Printer Commands

Printer Command	Function	# Refers To
$^{E}_{C}$E	Resets the printer	n/a
$^{E}_{C}$&ℓ#X	Indicates number of copies	1 to 99
$^{E}_{C}$&ℓ#H	Selects paper source	Ø = print from current source 1 = tray input 2 = manual feed - paper 3 = manual feed - envelope
$^{E}_{C}$&ℓ#A	Sets paper size Sets envelope size	1 = executive 2 = letter 3 = legal 26 = A4 8Ø = Monarch 81 = Commercial 10 9Ø = DL 91 = C5
$^{E}_{C}$&ℓ#O	Selects orientation	Ø = portrait 1 = landscape
$^{E}_{C}$&a#L	Sets left margin	column number
$^{E}_{C}$&a#M	Sets right margin	column number
$^{E}_{C}$&ℓ#E	Sets top margin	number of lines
$^{E}_{C}$&ℓ#D	Sets line spacing	lines per inch: (1,2,3,4,6,8,12,16,24, or 48)
$^{E}_{C}$&d#D	Begins underline	Ø = fixed 3 = floating
$^{E}_{C}$&d@	Ends underline	n/a

Table 2-1. Printer Commands (continued)

Printer Command	Function	# Refers To
E_C(#X	Selects primary soft font by ID	soft font ID number
E_C)#X	Selects secondary soft font by ID	soft font ID number
E_C&k#H	Sets horizontal motion index	$\frac{1}{120}$ th inch increments
E_C&ℓ#C	Sets vertical motion index	$\frac{1}{48}$ th inch increments
E_C(s#V	Sets point size (height)	$\frac{1}{72}$ nd inch increments

Refer to the *LaserJet III Printer Technical Reference Manual* for detailed explanations of all printer commands.

How to Use Printer Commands

If your software does not automatically send printer commands, you can enter them directly in your file, or in a menu provided by your software. Refer to your computer and software manuals to find the method to use to enter printer commands. The *Software Application Notes* may also be helpful – it explains how to use printer commands with many popular software packages.

The escape character $^{E}_{C}$ is often represented by:

- 1B (Hexadecimal)
- 27 (Decimal)

Usually, the $^{E}_{C}$ character does not appear on your screen. Instead, a different character appears, depending on the software you are using. How you insert the escape character $^{E}_{C}$ and what it looks like on your screen depends on your software package. Here are some examples:

Table 2-2. Software Escape Character Commands

Software Package	Entry	What Appears
Lotus 1-2-3 and Symphony	Type \Ø27	\Ø27
Executive MemoMaker	Type the $^{E}_{C}$ key	[(highlighted)
Microsoft Word	Hold down ALT key and type 27 on the numeric keypad	←
WordPerfect	Type <27>	<27>
Wordstar 2000 Plus Release 3	(For initialization strings) type 1B	1B
Wordstar 3.3	(For initialization strings) type 1B	1B

The printer commands seen on the screen are not printed and do not take up space on printed copy. They may take up space on the screen.

In printer commands the escape character precedes additional characters (ASCII characters), or hexadecimal representations of these characters. For example, the landscape orientation command can be entered using these ASCII characters in Lotus 1-2-3:

\ø27&ℓ1O

In Wordstar 3.3, you enter the same command using these hexadecimal codes:

1B 26 6C 31 4F

(Appendix B lists the hexadecimal codes for printer commands.) Once you know which method to use to enter commands (if required by your software), read the next section to learn how to shorten them. Combining commands is especially helpful if you are using set-up strings.

Note



A command that the printer receives stays in effect until changed by a subsequent command.

For example, if you send the printer a command to change the left margin, each page will print with that margin setting until you send a new margin command or reset the printer.

To reset the printer, take the printer off-line and hold down Reset until 07 RESET appears in the display. Alternatively, send the reset printer command ($^{E}_{C}$E).

Combining Printer Commands

Some printer commands can be combined before sending them to the printer. With some software packages, you may need to shorten the string of commands because of limited string length.

These two printer commands set the page size to letter and the orientation to landscape:

$^{E}_{C}$&ℓ3A and $^{E}_{C}$&ℓ1O

They can be combined and sent to the printer like this:

$^{E}_{C}$&ℓ3a1O

Notice that the $^{E}_{C}$, the &, and the ℓ are dropped from the second printer command when they are combined. Also, the upper-case A that ended the first command becomes a lower-case a when these commands are combined.

Use these three rules to combine and shorten printer commands:

- The first two characters after $^{E}_{C}$ must be the same in all printer commands you want to combine. In the example above, these characters are & and ℓ.
- All alphabetic characters within the combined printer commands must be lowercase, except the final letter. In the combined example above, A becomes a. The final character in the printer command must always be uppercase to tell the printer the command sequence is complete.
- Printer commands take effect as your software encounters them (from left to right). Be sure to combine printer commands in the order in which the printer should perform them.

An example of how printer commands are combined can be found on the Font Sample Printout. The last column shows the Print Sample & Escape Sequence. The escape sequence shown is a combination of several commands specifying the symbol set, spacing, pitch, point size, style, stroke weight, typeface, and orientation.

The *LaserJet III Printer Technical Reference Manual* contains detailed information on printer command hierarchy.

3

Using Type



Hewlett-Packard offers type in the form of **scalable typefaces** and **bitmapped fonts.** Scalable typefaces and bitmapped fonts determine the selection and appearance of characters on the printed page.

For Experienced Users

If you are already knowledgeable about the use of fonts, you may not need to read this chapter. However, the LaserJet III printer features scalable typefaces and more fonts and symbol sets than previous models of LaserJet printers. Reviewing the pertinent material in this chapter will add to your understanding.

What Are Typefaces?

Typefaces are collections of characters and symbols that have a unique design, or "look". Broadly, typefaces are designed with serifs or without serifs (also called *sans serif*). Figure 3-1 shows examples of serif and sans serif typefaces.



Figure 3-1. Serif and Sans Serif Typefaces

Serif typefaces have delicate details on the characters. Sans serif typefaces lack those details, providing an entirely different appearance.

What Are Fonts?

Fonts are collections of characters and symbols that have a unique design and a *specific size.* A typeface becomes a font when it is associated with a specific size. Figure 3-2 shows several different fonts in a range of sizes and typefaces.

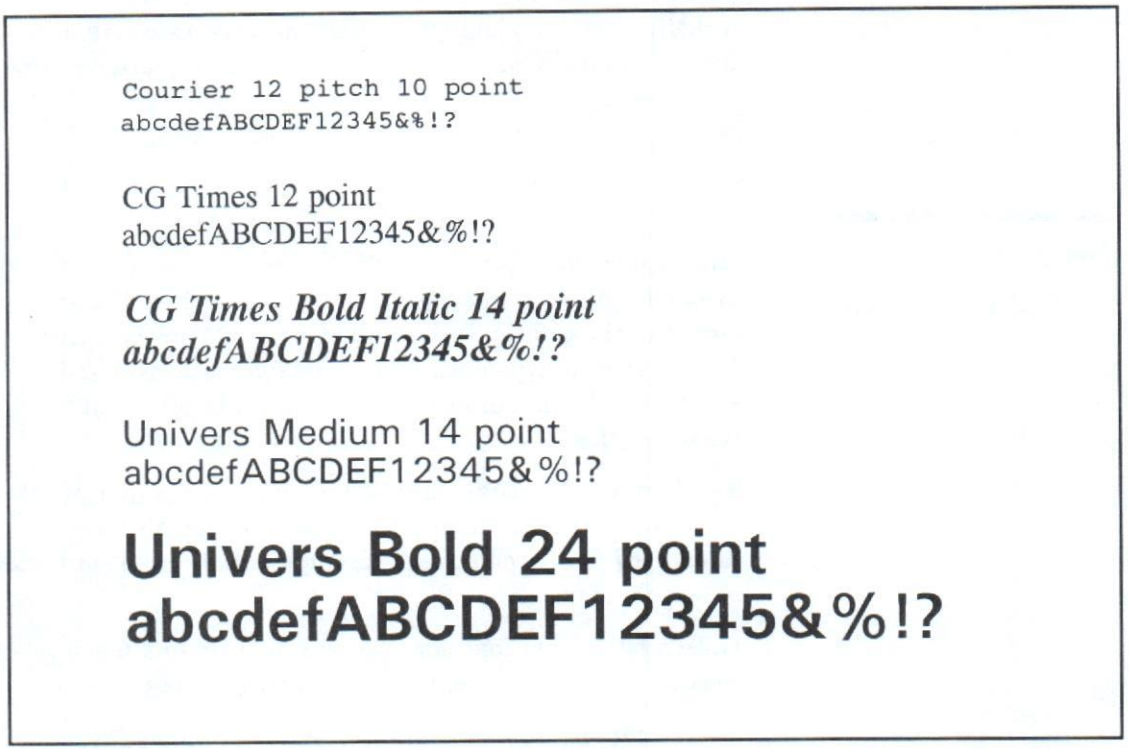
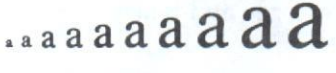


Figure 3-2. Font Samples

What Are Scalable Typefaces?



Scalable typefaces are typefaces you can shrink or enlarge to meet a particular need. Once you scale a typeface to a specific size you have created a bitmapped font.

Scalable typefaces are included inside the LaserJet III printer and are also available in cartridges and on floppy diskettes. With scalable typefaces you can create virtually limitless fonts in sizes up to 999.75 points in quarter-point increments.

What Are Bitmapped Fonts?

Bitmapped fonts are a collection of characters and symbols with a unique design and a specific size that are stored in the printer, in cartridges, or on floppy diskettes. Unlike scalable typefaces, bitmapped fonts are rigid and unchangeable, because they are mapped out bit-by-bit wherever they reside.

The LaserJet III printer has 14 bitmapped fonts in a variety of symbol sets as an internal feature. You can also use bitmapped fonts available on cartridges, and download them as soft fonts from your PC.

Once a bitmapped font is present in the printer's memory, regardless of the source, you can instantly access it.

Each point size you use, however, requires a separate bitmapped font. This means more printer memory is needed to download a wide range of point sizes than with a comparable downloaded scalable typeface. If you use many downloaded bitmapped fonts, you may run out of printer memory, or you may have to frequently remove some fonts to download others. You are also limited to exactly the font sizes provided; if you want to use a different size, you must download another font.

Font Characteristics

Fonts are described by seven characteristics:

- **Symbol Set** - a collection of characters and symbols; for example, Roman-8, ASCII, and Linedraw.
- **Spacing** - Proportional or fixed pitch
- **Pitch** - The number of fixed-space characters printed per horizontal inch
- **Point Size** - Font height
- **Style** - the appearance and posture of the font (for example, upright, italic, condensed, or outline)
- **Stroke Weight** - Medium, bold, light, black, and so forth.
- **Typeface** - a design of characters; for example, Courier, CG Times, and Univers.

Symbol Set

Symbol set refers to the specific alphabetic, numeric, punctuation and special symbols in a font. A typeface contains hundreds of different symbols. Symbol sets are subgroupings of all these symbols. Usually, symbol sets match specific application or language requirements. For example, the legal and math symbol sets support legal and scientific applications. Check your software to see which symbol sets it supports.

Figure 3-3 shows two different symbol sets available in the Courier typeface. Note that the two symbol sets contain many characters in common, but each has some characters not found in the other.

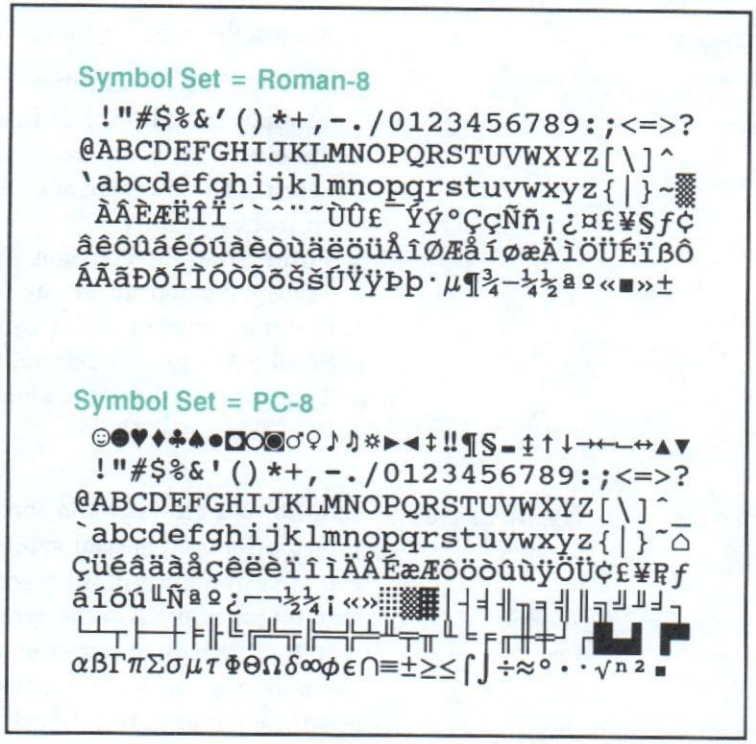


Figure 3-3. Symbol Sets

Tables 3-1 and 3-2 list the names of the LaserJet III printer's internal symbol sets. Table 3-1 lists the symbol sets available to all internal fonts and typefaces.

Table 3-1.
LaserJet III Printer Internal Symbol Sets
(Scalable Typefaces and Bitmapped Fonts)

Symbol Set	Control Panel Display	Symbol Set ID
Roman-8	ROMAN-8	8U
ECMA-94 Latin 1	EC94-L1	0N
PC-8	PC-8	10U
Danish/Norwegian	PC-8 DN	11U
PC-850	PC-850	12U
Legal	LEGAL	1U
ISO IRV	ISO 2	2U
ISO United Kingdom	ISO 4	1E
ASCII	ISO 6	0U
ISO Swedish/Finnish	ISO 10	3S
ISO Swedish: names	ISO 11	0S
JIS ASCII	ISO 14	0K
ISO Italian	ISO 15	0I
ISO Portuguese	ISO 16	4S
ISO Spanish	ISO 17	2S
ISO German	ISO 21	1G
ISO French	ISO 25	0F
ISO Chinese	ISO 57	2K
ISO Norwegian v1	ISO 60	0D
ISO Norwegian v2	ISO 61	1D
ISO French	ISO 69	1F
ISO Portuguese	ISO 84	5S
ISO Spanish	ISO 85	6S
HP German	German	0G
HP Spanish	Spanish	1S

The additional symbol sets in Table 3-2 are available only to the internal scalable typefaces.

Table 3-2.
LaserJet III Printer Internal Symbol Sets
(Internal Scalable Typefaces Only)

Symbol Set ID	Control Panel Display	Symbol Set
6M	VN Math	Ventura Math
13J	VN Intl	Ventura International
14J	VN US	Ventura US
5M	PS Math	PS Math
10J	PS Text	PS Text
8M	Math-8	Math-8
15U	Pi Font	Pi Font
6J	MS Publ	Microsoft Publishing
9U	Windows	Windows
7J	DeskTop	DeskTop

Refer to Appendix A for additional symbol set information.

Spacing

All fonts use either **fixed spacing** or **proportional spacing.**

With fixed spacing, the effective width of each character is the same. For example, a "w" and an "i" have equal widths (see Figure 3-4). Typewriter typefaces such as Courier and Letter Gothic use fixed spacing.

With proportional spacing, the width of characters varies. For example, a "w" has a much larger width than an "i." Publication typefaces, like CG Times and Univers (and Century Schoolbook, the typeface of this text) are proportionally spaced.

AutoFont Support

Hewlett-Packard provides font width information for your software through **AutoFont Support.** Your software uses font width information to determine how many characters will fit on a line in any given point size.

Included with the most recent HP bitmapped font and scalable typeface products is a diskette holding **AutoFont Support** files. These files have the extension `.TFM`. Installation instructions are included with each diskette.

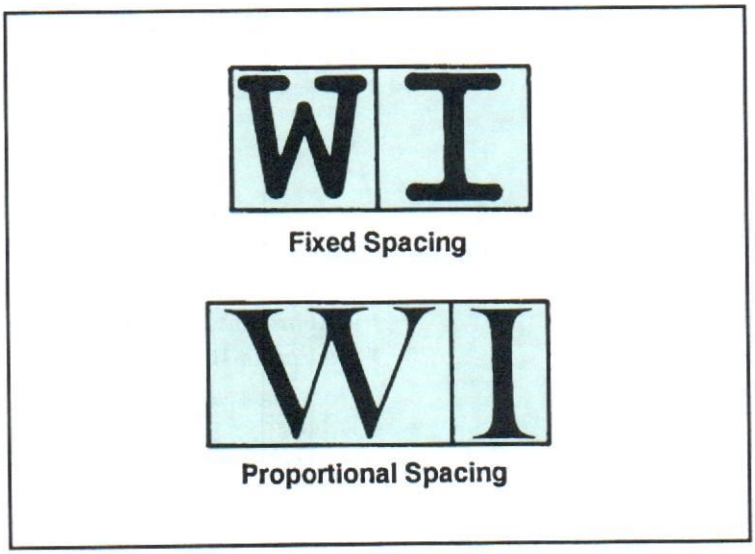


Figure 3-4. Fixed and Proportional Spacing

Pitch

Pitch refers to the number of characters that can be printed in one horizontal inch. For example a font with a pitch of 10 will print 10 characters for every horizontal inch of text. Pitch applies only to fonts with fixed spacing. Fonts with proportional spacing have no specified pitch.

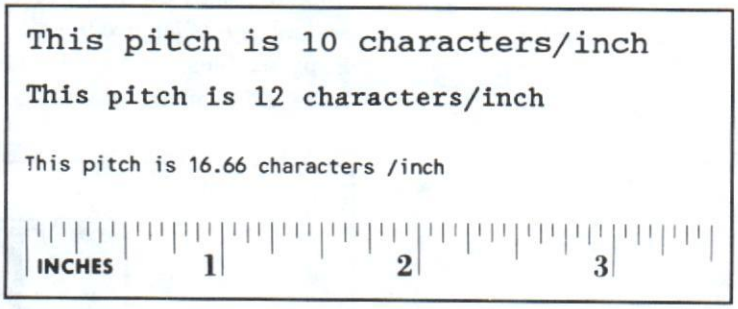


Figure 3-5. Pitch

Point Size

Points measure the height of a font. Seventy-two points equals one inch. A font with a point size of 36, for example, is approximately half an inch high. The font you are reading is 10 points.

Note

Point size is measured from slightly above the *top* of uppercase letters to slightly below the *bottom* of lowercase descenders, for example, the tail of the letter "y."

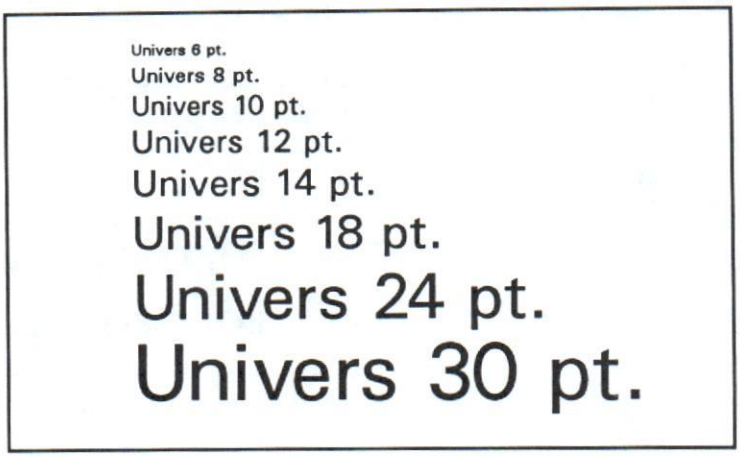


Figure 3-6. Point Size

Style

Style connotes the *shape* of a character, such as upright, condensed, or italic. *Italic* is often used to add emphasis or to designate the title of a book. Another term, **treatment,** describes a combination of style and stroke weight.



Figure 3-7. Style

Stroke Weight

Stroke weight refers to the thickness of print, such as light, medium, bold, and black. For example, **use bold to highlight important information.** Another term, **treatment,** describes a combination of stroke weight and style.

MEDIUM MEDIUM MEDIUM

BOLD BOLD BOLD BOLD BOLD

Figure 3-8. Stroke Weight

Typeface

Typeface refers to the design of characters and symbols. The body text of this manual is in the *Century Schoolbook* typeface. Typefaces improve (or impair) readability, focus the reader's attention, create moods and add impact. Figure 3-9 shows a few of the hundreds of different typefaces.

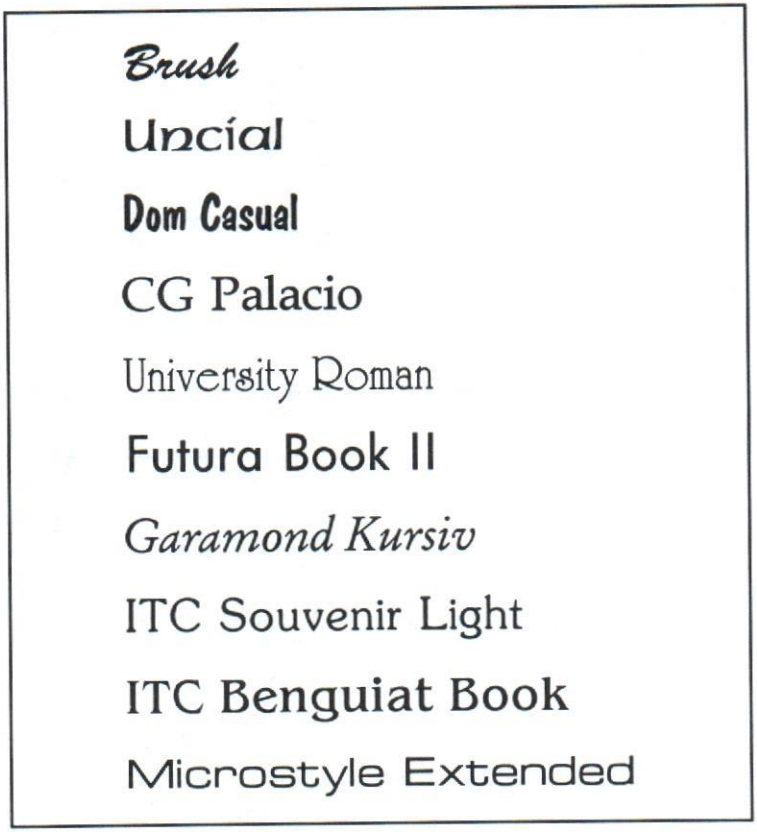


Figure 3-9. Different Typefaces

Typefaces are commonly described with their **treatment,** which combines the characteristics of style and stroke weight. The names CG Times, CG Times Italic, and CG Times Bold are all treatments of the CG Times typeface.

LaserJet III Printer Type Offering

Your printer comes with scalable typefaces and bitmapped fonts. (Refer to Tables 3-1 and 3-2 for the supported symbol sets.)

Table 3-3. Internal Scalable Typefaces

TYPEFACE	TREATMENT
CG Times	(medium)
CG Times	Italic
CG Times	Bold
CG Times	Bold Italic
Univers	Medium
Univers	Italic
Univers	Bold
Univers	Bold Italic

Table 3-4. Internal Bitmapped Fonts

TYPEFACE	PITCH	POINT	TREATMENT	ORIENTATION*
Courier	12	10	(medium)	portrait & landscape
Courier	12	10	Bold	portrait & landscape
Courier	12	10	Italic	portrait
Courier	10	12	Regular	portrait
Courier	10	12	Bold	portrait
Courier	10	12	Italic	portrait & landscape
Line Printer	16.66	8.5	(medium)	portrait & landscape

*Your printer rotates any font to the orientation you select, if the font is not already available in that orientation. (See the next section, *The Font Rotation Feature.*)

Default Font

Courier Portrait 10 pitch, 12 point (medium) is the font the printer uses unless you:

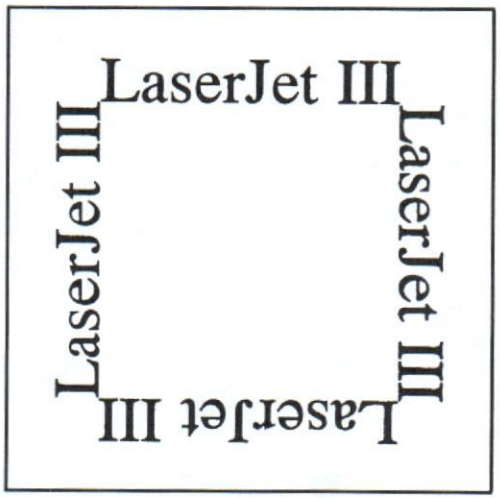
1. Send a font selection command (using software or a printer command) to request a font in place of the default.
2. Insert a font cartridge with a default font. If two font cartridges are present and both have default fonts, the printer selects the left cartridge default font.
3. Select a different default font using the control panel.

The Font Rotation Feature

Using the font rotation feature, you can print fonts available in only one orientation in any of the four orientations (portrait, landscape, reverse portrait, reverse landscape).

For example, the fonts on some font cartridges are available only in portrait orientation. The LaserJet III printer automatically rotates these fonts 90 degrees when you select landscape orientation.

Rotating a font uses more memory and may be slower than selecting a font already in the requested orientation. Select a font that exists in the desired orientation whenever possible.



Four Orientations

The Font Printout

The font printout is a list of the scalable typefaces and bitmapped fonts currently available to your printer.

Caution

Generating the font printout deletes all **temporary soft fonts.** Because of this, temporary soft fonts do not appear on the printout.

To print a list of the printer's current fonts:

1. Take the printer off-line.
2. Press (Print Fonts) on the control panel.

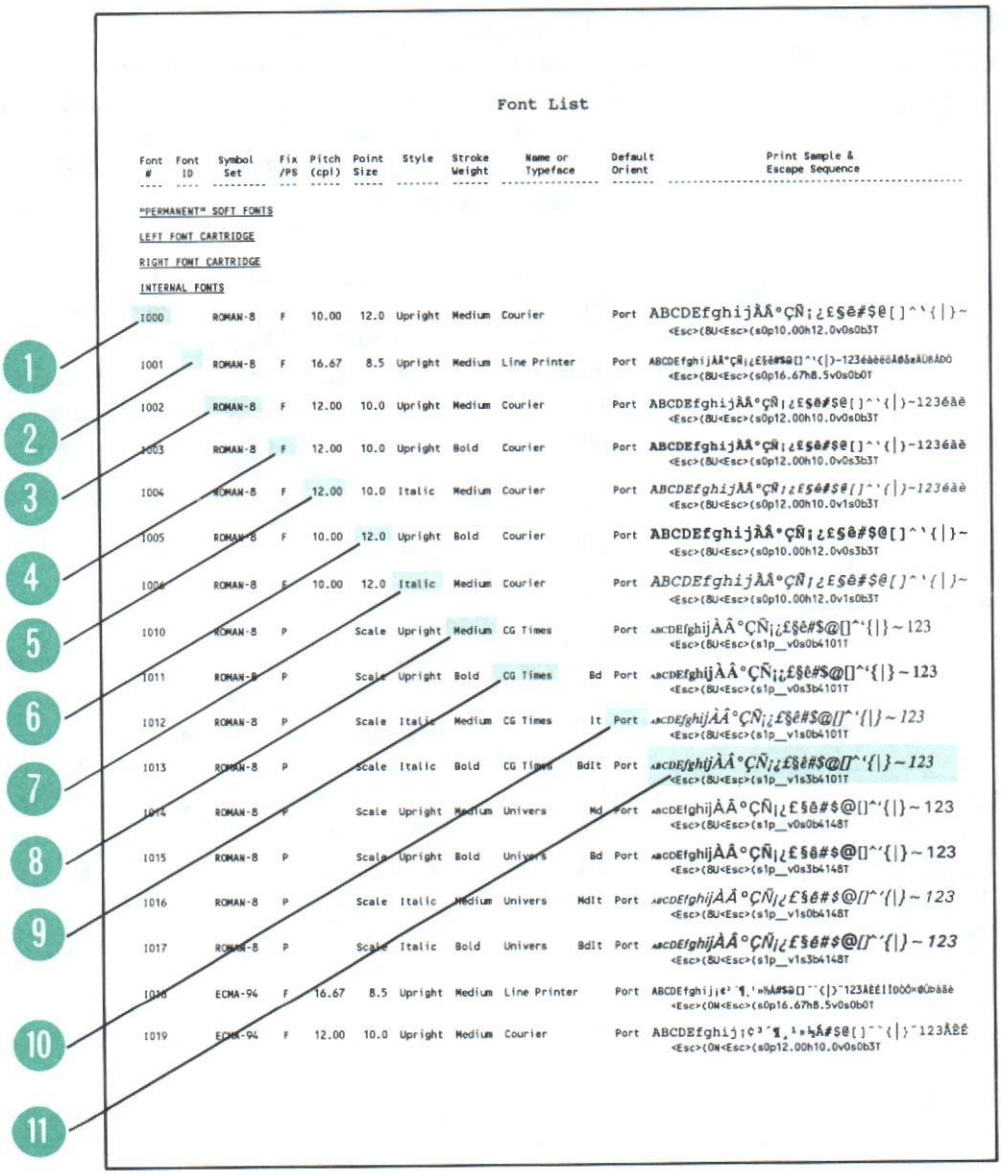
`06 FONT PRINTOUT` appears in the display and several pages are printed. The printout contains 11 columns of information (see Figure 3-10):

1. **Font #** is the number you use to select internal, cartridge, or downloaded soft fonts from the control panel. (Don't confuse font *number* with the soft font *ID,* described next.)

 The letter preceding the font number shows the source of the font.
 - S = permanent soft font, residing in printer memory
 - R = fonts in the right cartridge slot
 - L = fonts in the left cartridge slot
 - I = internal printer fonts
2. **Font ID** is an ID number you assign to soft fonts when you download them through your software.
3. **Symbol Set** is the specific collection of characters and symbols associated with a font.
4. **Fix/PS** indicates whether the font has fixed spacing or proportional spacing.
5. **Pitch (cpi)** is the number of characters per inch of the fixed pitch font. This field contains "Scale" for a scalable typeface.
6. **Point Size** is the font height. This column contains "Scale" for a scalable typeface.

7. **Style** indicates the appearance and posture of the font, such as italic, upright, or condensed.
8. **Stroke Weight** is a font treatment, such as medium, bold, light, or black.
9. **Name or Typeface** is the name of the font or typeface.
10. **Default Orient** is the orientation: portrait or landscape.
11. **Print Sample & Escape Sequence** - contains two lines per entry. The top line is a **print sample** that shows what the characters look like. The bottom line contains the **escape sequence** that selects the designated font.

 If the print sample represents a scalable typeface the characters will be shown in an ascending point size. The escape sequence will also show a blank space (indicated by an underscore, _____) followed by v or h. In the escape sequence, you must supply the corresponding point size (for example, 14.25v) or pitch (for example, 12.00h).



Font List

	Font #	Font ID	Symbol Set	Fix /PS	Pitch (cpi)	Point Size	Style	Stroke Weight	Name or Typeface	Default Orient	Print Sample & Escape Sequence
	"PERMANENT" SOFT FONTS										
	LEFT FONT CARTRIDGE										
	RIGHT FONT CARTRIDGE										
	INTERNAL FONTS										
1	1000		ROMAN-8	F	10.00	12.0	Upright	Medium	Courier	Port	ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`{\|}~ <Esc>(8U<Esc>(s0p10.00h12.0v0s0b3T
2	1001		ROMAN-8	F	16.67	8.5	Upright	Medium	Line Printer	Port	ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`{\|}~123éàèëêÄâåæÄÜêÄÐÓ <Esc>(8U<Esc>(s0p16.67h8.5v0s0b0T
3	1002		ROMAN-8	F	12.00	10.0	Upright	Medium	Courier	Port	ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`{\|}~1236âè <Esc>(8U<Esc>(s0p12.00h10.0v0s0b3T
4	1003		ROMAN-8	F	12.00	10.0	Upright	Bold	Courier	Port	**ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`{\|}~1236âè** <Esc>(8U<Esc>(s0p12.00h10.0v3b3T
5	1004		ROMAN-8	F	12.00	10.0	Italic	Medium	Courier	Port	*ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`{\|}~1236âè* <Esc>(8U<Esc>(s0p12.00h10.0v1s0b3T
6	1005		ROMAN-8	F	10.00	12.0	Upright	Bold	Courier	Port	**ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`{\|}~** <Esc>(8U<Esc>(s0p10.00h12.0v0s3b3T
7	1006		ROMAN-8	F	10.00	12.0	Italic	Medium	Courier	Port	*ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`{\|}~* <Esc>(8U<Esc>(s0p10.00h12.0v1s0b3T
8	1010		ROMAN-8	P		Scale	Upright	Medium	CG Times	Port	ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`{\|}~123 <Esc>(8U<Esc>(s1p__v0s0b4101T
9	1011		ROMAN-8	P		Scale	Upright	Bold	CG Times	Bd Port	**ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`{\|}~123** <Esc>(8U<Esc>(s1p__v0s3b4101T
10	1012		ROMAN-8	P		Scale	Italic	Medium	CG Times	It Port	*ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`{\|}~123* <Esc>(8U<Esc>(s1p__v1s0b4101T
11	1013		ROMAN-8	P		Scale	Italic	Bold	CG Times	BdIt Port	***ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`{\|}~123*** <Esc>(8U<Esc>(s1p__v1s3b4101T
	1014		ROMAN-8	P		Scale	Upright	Medium	Univers	Md Port	ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`{\|}~123 <Esc>(8U<Esc>(s1p__v0s0b4148T
	1015		ROMAN-8	P		Scale	Upright	Bold	Univers	Bd Port	**ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`{\|}~123** <Esc>(8U<Esc>(s1p__v0s3b4148T
	1016		ROMAN-8	P		Scale	Italic	Medium	Univers	MdIt Port	*ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`{\|}~123* <Esc>(8U<Esc>(s1p__v1s0b4148T
	1017		ROMAN-8	P		Scale	Italic	Bold	Univers	BdIt Port	***ABCDEfghijÀÂ°ÇÑ¡¿£§ê#$@[]^`{\|}~123*** <Esc>(8U<Esc>(s1p__v1s3b4148T
	1018		ECMA-94	F	16.67	8.5	Upright	Medium	Line Printer	Port	ABCDEfghij¡¢³´¶¸¹»¼Á#$@[]¨ˆ{\|}˜123ÂÊÉÍÎÖÔÖ×ØÚÞâãè <Esc>(0N<Esc>(s0p16.67h8.5v0s0b0T
	1019		ECMA-94	F	12.00	10.0	Upright	Medium	Courier	Port	ABCDEfghij¡¢³´¶¸¹»¼Á#$@[]¨ˆ{\|}˜123ÂÊÉ <Esc>(0N<Esc>(s0p12.00h10.0v0s0b3T

Figure 3-10. Font Printout

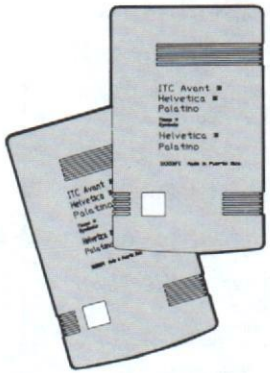
Typeface and Font Cartridges

Scalable typeface and bitmapped font cartridges supplement the printer's internal offering. Many optional cartridges are available. Refer to your *Supplies and Accessories* brochure for a list of Hewlett-Packard typeface and font cartridges and purchasing information.

Caution

Do not insert or remove typeface or font cartridges while the printer is on-line or while the Form Feed indicator is on. This disables the printer's ability to read and access the cartridge fonts, and causes a printer error message to appear. If this happens you must power the printer OFF and back ON again to recover. Any data in printer memory is lost.

Installing Typeface and Font Cartridges



To install cartridges in the printer:

1. Take the printer off-line.
2. Make sure the Form Feed indicator is off. (If it is on, make sure the printer has stopped receiving data, then press Form Feed to print the remaining data).
3. Slide the cartridge into either slot on the lower front of the printer and push until the cartridge is firmly in place (Figure 3-11). You should hear and feel the cartridge snap into place.
4. Return the printer on-line.

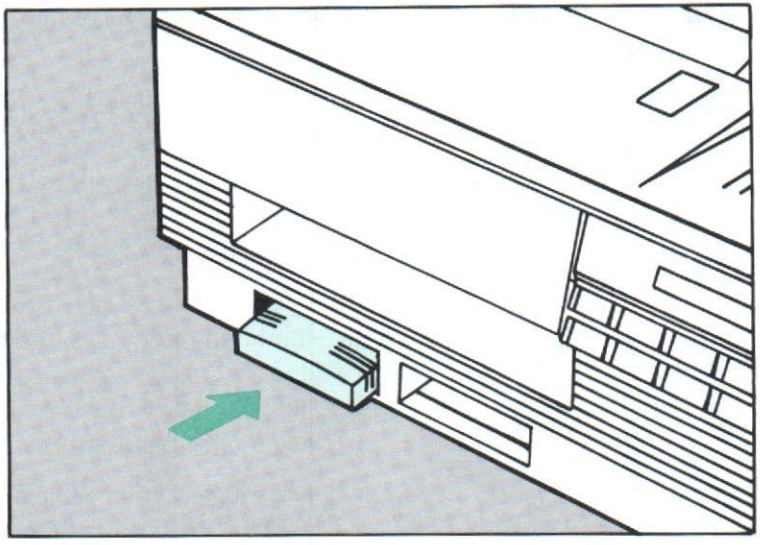


Figure 3-11. Inserting a Cartridge

Understanding the Font Cartridge Label

The label on a font cartridge provides information about what typefaces or fonts the cartridge contains. Some cartridges have a default, which is the bitmapped font automatically used unless you select a different font through your application, printer commands, or from the control panel. The default is identified by an asterisk (*).

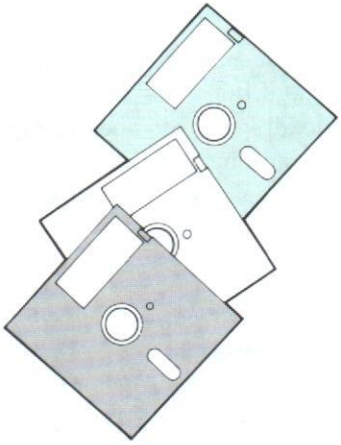
If both cartridge slots contain a default font, the default font in the left cartridge takes precedence.

Selecting Default Cartridge Fonts

If you are using a cartridge font as your default, remember the following:

- Do not remove or insert cartridges while the printer is on-line or while the Form Feed indicator is lit.
- The printer returns to the factory default if a cartridge containing a default font is removed while the printer is on.
- If you use the control panel to select a cartridge font as the default, you may turn the printer off and remove the cartridge for storage. When you reinsert the cartridge in the same slot before turning the printer back on, the cartridge font will still be the default.
- Some cartridges contain a default font, noted by an asterisk (*) on the cartridge label. When these cartridges are installed, the printer uses the cartridge default font unless you select a different font using the control panel.
- The left slot has priority over the right slot. Neither overrides a user-selected default on the control panel.

Soft Fonts and Typefaces



Soft fonts are bitmapped fonts available in many different styles, sizes, and stroke weights. They are supplied on floppy diskettes and can be transferred (downloaded) by your application to the printer's memory. Scalable typefaces are also available.

Scalable typefaces, when used in conjunction with later releases of the *Type Director* utility, can also be prepared and installed for downloading by your application.

Many optional Hewlett-Packard soft fonts and scalable typefaces are available - refer to the Hewlett-Packard *Supplies and Accessories* brochure that comes with the printer for a current listing. Contact your Hewlett-Packard Sales Representative or authorized dealer for purchasing information.

Downloading Soft Fonts and Typefaces

Software packages vary in the kinds of type products they can download. Some packages automatically download any kind of type for you; others may download bitmapped fonts only. Check the font section of your software manual for specific instructions.

If your software does not download type for you, Hewlett-Packard provides you with several methods to make the downloading process easier.

Downloading Using Type Director

Type Director is Hewlett-Packard's typeface and font management program. Use *Type Director* to install scalable typefaces and prepare them for downloading. *Type Director* also helps you create high quality screen fonts to complement and enhance the capabilities of your software application.

Note

Unlike soft fonts, which can be simply copied into a directory, a scalable typeface *requires* that you use the *Type Director* utility to prepare it for the printer.

Refer to the *Type Director User's Guide,* which provides complete instructions for creating and installing scalable typefaces and fonts and for downloading. (This booklet also provides a *Quick Guide* containing step-by-step instructions for each task, such as installing typefaces, making fonts, and downloading fonts.)

Downloading using FontLoad

The *FontLoad* utility (HP product number 33407B), that comes with some Hewlett-Packard bitmapped soft fonts, makes the downloading process very easy. Refer to your *FontLoad User's Manual* for complete instructions.

Downloading using MS-DOS

You can use MS-DOS commands to download bitmapped soft fonts when no other software utility is available. See *Downloading Your Soft Fonts,* a booklet that comes with many of the fonts you purchase.

Clearing Soft Fonts and Scalable Typefaces.

You can clear soft fonts and scalable typefaces from printer memory by the following printer commands:

$^{E}_{C}$***cØF** – deletes all soft fonts

$^{E}_{C}$**E** or $^{E}_{C}$***c1F** – deletes all temporary soft fonts

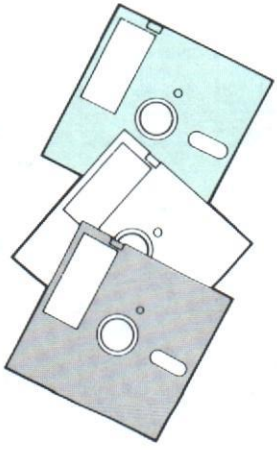
$^{E}_{C}$***c#d2F** – deletes the font ID# specified

Powering off the printer clears all soft fonts from memory.

You can also delete a soft font by overwriting it. If you load a soft font with the same ID# as an existing soft font, the old font is overwritten in the printer's memory.

For further information on managing soft fonts with printer commands, refer to the *LaserJet III Printer Technical Reference Manual.* (See page *vii* for ordering information.)

Soft Font and Typeface User Hints



To operate your printer efficiently, consider the following – especially where several users share a printer.

- Powering off the printer deletes all downloaded scalable typefaces and soft fonts. You must download them again to use them.
- The printer has a limited amount of memory in which to store downloaded scalable typefaces and bitmapped fonts. Each occupies a portion of memory that cannot be used for anything else until you delete the font. Download only those you need and wait until you need others before you download them.
- If you use a lot of downloaded scalable typefaces and bitmapped fonts, or if you create and use very large font sizes, consider purchasing an optional printer memory card. This card expands the printer memory, allowing more scalable typefaces and bitmapped fonts to be stored. (See Appendix E.)
- If the printer is shared among several users, decide which scalable typefaces and bitmapped fonts to download and the ID numbers to assign them. Making these decisions

helps avoid problems such as downloading duplicate fonts or deleting fonts needed by others.

Special Application Fonts

Hewlett-Packard designs some fonts for special applications such as printing bar codes, preparing presentation slides, or producing special symbols such as those used in legal documents or in mathematical formulas.

Some of the applications are shown in Figure 3-12. For ordering information see your dealer or the *Supplies and Accessories* brochure.

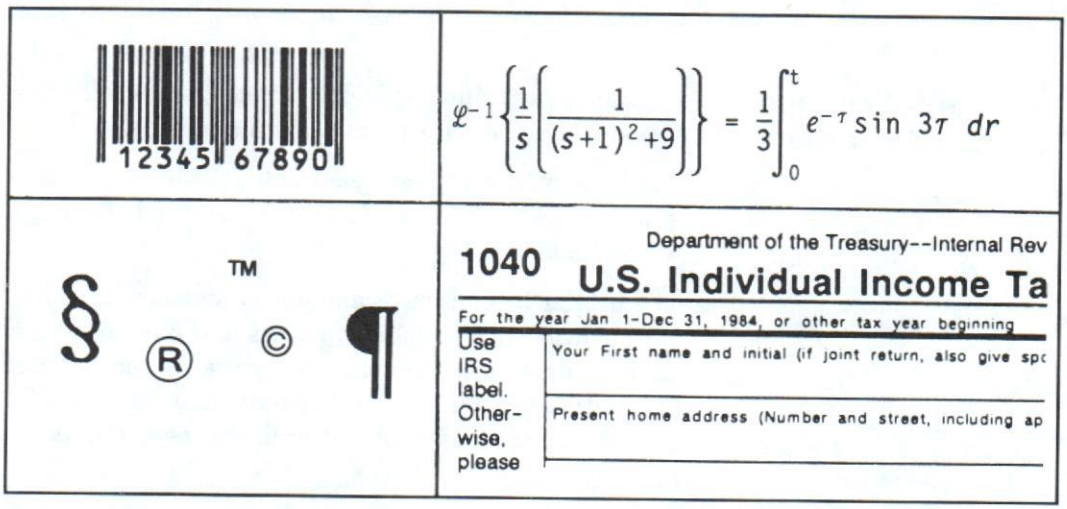


Figure 3-12. Special Applications Using Fonts

Custom Font Cartridges, Macro Cartridges, and Soft Fonts

You can design your own custom font cartridge, macro cartridge (for preprinted forms and overlays), or soft font package. In addition to assembling a custom font collection, you can create special symbol set mappings, company logos, signatures, and special forms or graphic designs.

Hewlett-Packard provides a service to assist you by developing these customized products. For information, contact:

Hewlett-Packard Boise Printer Division
Attention: Product Specials
11311 Chinden Blvd
Boise, ID 83714
(208) 323-3684

Selecting Type

You can select fonts using your application software, printer commands, or by using the control panel.

There are many different ways to select type. Ask yourself the following questions to determine the best way for you.

- Does your printer have enough memory to use many soft fonts?
- Does your software support the scalable typefaces and bitmapped fonts you want to use? to find out:
 - Check your software manual.
 - Check the *Software Application Notes* that came with this printer.
 - Call your software manufacturer for the most current information on printer drivers.
- Does your software support both scalable typefaces and bitmapped fonts?
- Do you know how your software selects fonts? Consider:
 - Some software allows you to select a limited number of fonts at one time (for example, WordPerfect 4.2).
 - Some software allows fixed-pitch fonts only (for example, Lotus 1-2-3).
 - Some software requires printer drivers and spacing tables to select fonts for you (for example, Microsoft Word).

If you do not select a font then the printer uses the current default font. The default font is Courier, 12 point, 10 pitch, upright, medium-weight with the Roman-8 symbol set, and in portrait orientation, unless you have manually changed the control panel Printing Menu setting or installed a cartridge with a default font.

Selection Priority

A desired font may be available from more than one source. In this case, the printer selects the source in the following order:

- The printer tries to select a downloaded soft font.
- If the requested font is not available as a soft font, the printer tries the left font cartridge, then the right.
- If the requested font is not available on cartridge, the printer selects an internal font.

When choosing a font, the font must be available from one of these sources. If the font you request is not available, the printer selects the closest match in characteristics.

If both a scalable typeface and a bitmapped font are available from the same source, the bitmapped font is used when the characteristics match. Otherwise, the font derived from the scalable typeface is used.

Selecting Type Using Applications

The easiest way to select scalable typefaces and bitmapped fonts is through your software package.

Many software packages support the fonts used with the LaserJet III printer . You can select fonts using your software instead of entering printer commands.

Most software applications allow you to define the scalable typefaces and bitmapped fonts to use in your documents. You usually make these definitions as part of the application's installation or set-up procedure. You then access your type using the procedures for your particular software. For example:

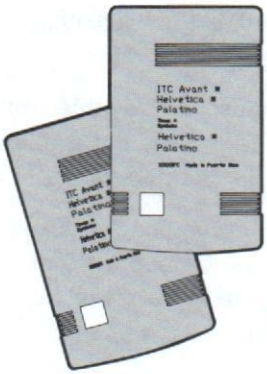
Multimate assigns a unique font letter to each font. To change from one font to another, change the Multimate font letter.

WordPerfect (version 4.2) selects fonts by using pre-defined font numbers.

Microsoft Word selects fonts by specifying the font name, size and treatment.

Check your software manual to find out which method your software uses to select type.

The *Software Application Notes* included with your LaserJet III printer also explains how some of the most popular software packages handle soft fonts.



Example — Selecting a Cartridge Font Using Software

The following example shows how to select and print a Letter Gothic font using WordPerfect Version 5.0 software and the *HP C2053A-C04 Persuasive Presentations* font cartridge.

Selecting the Cartridge:

1. Take the printer off-line.
2. Firmly insert the Persuasive Presentations font cartridge until you hear and feel a snap.
3. Return the printer on-line.
4. Load WordPerfect and press (SHIFT) (F7) to display the **Print/Options** menu.
5. At the **Selection:** prompt, type [S] **Select Printer** to display the **Print: Select Printer** menu.
6. Type [2] **Additional Printers** to display the **Select Printer: Additional Printers** menu.

 Use the arrow keys to highlight the LaserJet III selection (or LaserJet IID if you do not have the most recent WordPerfect drivers).
7. Type [1] **Select.**

 If you have selected this printer previously, you may see the **Replace .PRS? (Y/N)** prompt. If you do, enter a new name or type [Y] to overwrite the existing file.
8. Press (F7) to return to the **Select Printer: Edit** menu.
9. At the **Selection:** prompt, on the **Select Printer: Edit** menu, type [5] **Cartridges and Fonts** to display the **Select Printer: Cartridges and Fonts** menu.

10. Use the arrow keys to highlight the **Cartridge Fonts** option and type [1] **Select Fonts.** A list of possible font cartridges appears.
11. Use the arrow keys to highlight the HP Persuasive Presentations Cartridge option and type an [*] (asterisk).
12. Press F7 to save your font cartridge selection.
13. Press F7 to exit the font selection screen.

Selecting the Letter Gothic Font:

1. Press CTRL F8 to display the **Font** menu.
2. Type [4] **Base Font** to display a list of available fonts.
3. Use the arrow keys to highlight the Letter Gothic 14-point font as your base font.
4. Type [1] **Select** to specify the Letter Gothic font.
5. Enter the following:

   ```
   This text is printed in Letter Gothic 14 point.
   ```

6. Press SHIFT F7 1 `Full Text` to print your sample.

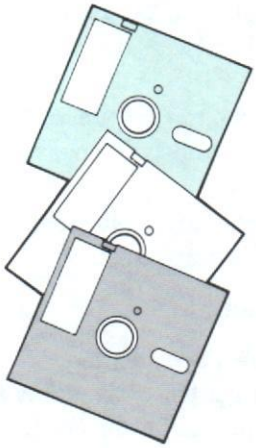
```
This text is printed in Letter Gothic 14 point.
```

Figure 3-13. WordPerfect Print Sample

Example — Selecting Soft Fonts Using Software

The following example shows how to select TmsRmn and Helv typefaces from the HP 33412AC soft font collection using Microsoft Word 4.0. (This example assumes you use the default subdirectory `C:\WORD`. If you use a different subdirectory for Microsoft Word's files, use that subdirectory in place of `C:\WORD` in the example.)

1. Copy the required Microsoft Word PRD and DAT files to your hard disk:
 a. Insert your Word *Printers 1* diskette in drive A:.



b. At the DOS prompt, enter:

 COPY A:HPDWNSFP.* C:\WORD (Enter)

c. Enter the following to copy Microsoft's soft font downloading program to your hard disk:

 COPY A:DOWN.EXE C:\WORD (Enter)

2. Copy the TmsRmn 12 point regular and italic soft font files to your hard disk. *For version 4.0, these files must be copied to the same subdirectory as the PRD and DAT files.*

 a. Insert your HP 33412AC soft font diskette #1 in drive A:.

 b. At the DOS prompt, enter the following:

 COPY A:TR12ORPN.USP C:\WORD (Enter)

 c. Enter the following:

 COPY A:TR12OIPN.USP C:\WORD (Enter)

3. Load Microsoft Word by typing WORD at your DOS prompt.
4. Press (Esc) (P)(rint) (O)(ptions) (F1) and highlight HPDWNSFP as the printer, then press (Enter) . Press (Esc) to return to the document screen.
5. Enter the following text:

```
This text is printed in TmsRmn 12 point.
This text is printed in TmsRmn 12 point italic.
```

6. Position your cursor anywhere in the first sentence and press (SHIFT)(F8) to highlight that sentence. Next, press (Esc) (F)(ormat) (C)(haracter) and specify: *font name:* TMSRMN and *font size:* 12 and (Enter) .
7. Position your cursor anywhere in the second sentence and press (SHIFT)(F8) to highlight that sentence. Next press (Esc) (F)(ormat) (C)(haracter) and specify: *italic:* Yes and *font name:* TMSRMN and *font size:* 12.

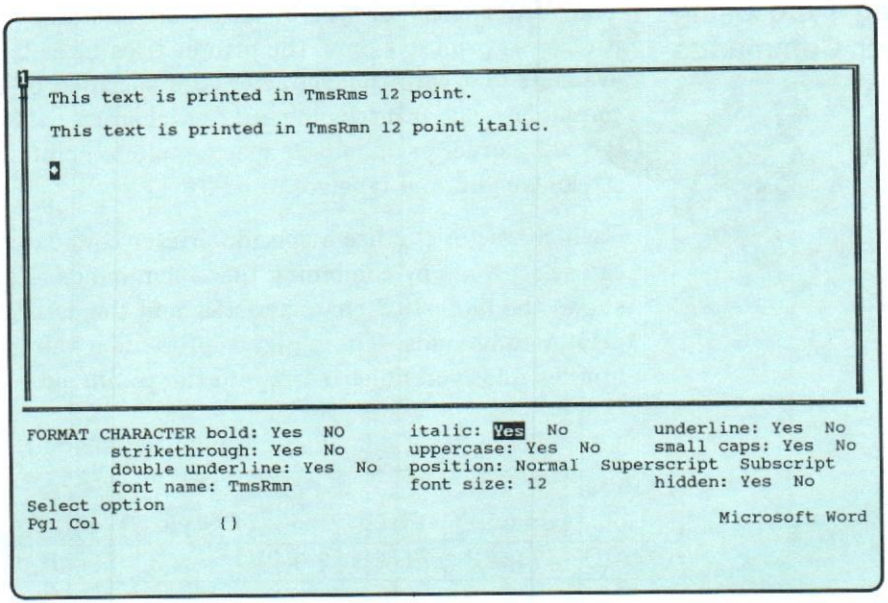


Figure 3-14. Selecting a Soft Font in Microsoft Word

8. Press Enter to return to your document.
9. Press Esc P (rint) P (rinter) and press Y to download the soft fonts and print your document.

This text is printed in TmnRmn 12 point.
This text is printed in TmnRmn 12 point italic.

Selecting Type Using Printer Commands



The printer looks for type by its characteristics. When it receives printable data, the printer tries to match an available font with the characteristics specified by the command. The printer matches font characteristics in the following order: symbol set, spacing, pitch, point size, style, stroke weight, and typeface.

Each characteristic has a specific printer command. You can select fonts by combining these commands. Table 3-5 shows the individual characteristics and the associated printer commands. The # sign represents a value or number that you must insert into the command.

Table 3-1. Font Characteristic Commands

Symbol Set	Spacing	Pitch	Point Size	Style	Stroke Weight	Typeface
E(#ID	E(s#P	E(s#H	E(s#V	E(s#S	E(s#B	E(s#T

The commands to select Roman-8, proportional, 12 point, italic, medium Univers font look like this:

E(8U E(s1p12v1s0b4148T

The printer commands you need to select the internal bitmapped fonts and scalable typefaces are shown on the Font List printout. Refer to Figure 3-10 and the accompanying explanation for the proper command sequence.

Refer to "Combining Printer Commands" in Chapter 2 for more information on how to combine (shorten) printer commands.

Example — Selecting a Cartridge Font Using Printer Commands

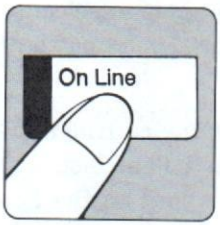
The following example shows you how to select a 14-point Letter Gothic font using the Lotus 1-2-3 and the *Persuasive Presentations* font cartridge.

- With the *Persuasive Presentations* cartridge inserted in one of the cartridge slots, print a Font List.
- Find the 14 point Letter Gothic font on the Font List. Beneath the print sample is the escape sequence needed to select this font. It is:

 $^{E}_{C}$(ØU$^{E}_{C}$(sØp1Ø.ØØh14.ØvØsØb6T
- Return the printer on-line.
- Load the Lotus 1-2-3 program.
- Within Lotus, type **/PPOS** to move to the set-up string menu.
- Enter the following printer commands:

 \027(ØU\027(sØp1Ø.ØØh14.ØvØsØb6T
- Press the Enter key on your computer keyboard.
- Type `Q` to exit from the options menu.
- Type `G` to print your document.
- Press On Line to take the printer off-line.
- Press Form Feed to print the last page, then press On Line to return the printer on-line again.

Selecting Type Using the Control Panel



If your software does not allow you to specify type, you can select any of the internal, cartridge, or downloaded soft fonts and scalable typefaces through the control panel. Refer to the discussion of the Printing Menu selections in Chapter 4 for instructions on selecting a default font.

Example — Selecting Cartridge Fonts From the Control Panel

The following example shows how to select a 24-point Helv Outline black portrait font in the Legal symbol set. This example assumes you have the C2053A-C04 *Persuasive Presentations* cartridge in the left cartridge slot.

1. Take the printer off-line.
2. Press [Print Fonts] to print a font list.
3. Find the font number that corresponds to the 24-point Helv Outline black portrait font in the Legal symbol set (Font #L007 on the font list).
4. Press [Menu] twice to display `FONT SOURCE=I*`.
5. Press [+] or [−] until `L` (for "left") appears.
6. Press [Enter] to save the selection. An * appears in the display.
7. Press [Menu] again to display `FONT NUMBER=1*`.
8. Press [+] or [−] until the number 7 appears.
9. Press [Enter] to save the selection. An * appears in the display.
10. Press [On Line] to exit the menu and return to the on-line state.

Example — Selecting Soft Fonts From the Control Panel

After you download a permanent soft font, you can select it for printing from the control panel. The following example shows how to access a downloaded, 12-point Dom Casual soft font.

1. Take the printer off-line and press [Print Fonts] to print a font list.

2. Find the font number that corresponds to the Dom Casual soft font.
3. Take the printer off-line and press [Menu] until `FONT SOURCE=I *` appears.
4. Press [+] until `FONT SOURCE=S` appears.
5. Press [Enter] to save your selection. The display now reads `FONT SOURCE=S *`.
6. Press [Menu] again. `FONT NUMBER=1 *` appears in the display.
7. Press [+] or [−] until the font number you found in the first step appears.
8. Press [Enter] to save your selection. An asterisk (*) will appear in the display.
9. Press [Menu]. `PT. SIZE=12.00` appears in the display.
10. Press [+] or [−] until the font size you want appears. Press [Enter] to save your selection.
11. Return the printer on-line.

Any documents you print will now appear in the Dom Casual font until you change the font using your software, printer commands, or the control panel.

Troubleshooting Font Problems

Check the following if you are having trouble selecting a font using printer commands:

- Is the font that you are trying to select available? Make sure by printing a Font Printout. If you are selecting a font from a cartridge make sure you have first installed that cartridge. If you are selecting a soft font, make sure you have downloaded the font to the printer.
- Are you using the correct font selection commands? Review "Selecting Type Using Printer Commands" in this chapter.
- Is the font cartridge firmly seated in the slot? Push it all the way in to make sure.
- Do some characters not print, while others in the symbol set do? Your software may not support some symbol sets, or you may be using an early font cartridge that does not have six Roman-8 characters, which are necessary for ISO symbol sets. These characters are:

Ý ý · µ ¶ ¾

If you need to print one of these characters, use one of the printer's internal fonts.

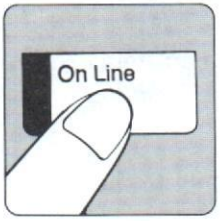
Check the following if you are having trouble selecting your default font using the control panel:

- If the message `10 RESET TO SAVE` appears in the display, did you hold down (Reset) until `07 RESET` appears? (Remember, this will erase any temporary fonts, macros, and page data stored in the printer's memory.)
- Have you selected the correct font from the control panel? Check by printing a Font Printout and comparing the Font # information with the control panel selection.
- Are you using the control panel's Printing Menu correctly? Review the instructions in Chapter 4 for correct operation.
- Is the font you are trying to select either available from a font cartridge or a downloaded soft font? Check by printing a Font Printout. Also, make sure that any installed font cartridges are properly seated.

4

Using the Control Panel

When to Use the Control Panel



The control panel allows you to use the Printing Menu and Configuration Menu. These menus allow you to select items such as the number of copies you want to print, the default font you want to use, and the interface for your system.

Much of the time you do not need to make printing selections from the control panel. Most software, including word processor and spreadsheet packages, provides procedures or commands for selecting printing options. If you use your software to control print jobs, you do not have to change control panel settings repeatedly. Software commands always override control panel settings; for example, a software command to print in landscape orientation will override the control panel's default portrait orientation.

Although many software applications control printer output, the degree of support varies among manufacturers. HP has designed the control panel to allow you to make selections manually when your software application doesn't. Use the control panel when:

- Your software doesn't allow you to make the selection.
- You are making printer configuration changes, which software can't control.
- You need to identify the fonts available in the printer's memory.
- You need to print a diagnostic test.
- You need to switch between on-line and off-line.

For Experienced Users

The LaserJet III printer control panel is similar to that of the LaserJet series II and IID, except in the following respects:

- You can choose from five display message languages (English, French, German, Italian, and Spanish).
- You can select the pitch or point size from the Printing Menu if your selected font is a scalable typeface.
- You can choose from an expanded list of symbol sets for the internal typefaces and cartridges. As with the LaserJet IID, the symbol set selection appears in the Printing Menu.
- You can select two new Configuration Menu items available only on the LaserJet III printer: *Resolution Enhancement* and *Page Protection.*

Review the sections in this chapter that apply to these changed features.

Control Panel Layout

The following diagram shows the control panel layout:

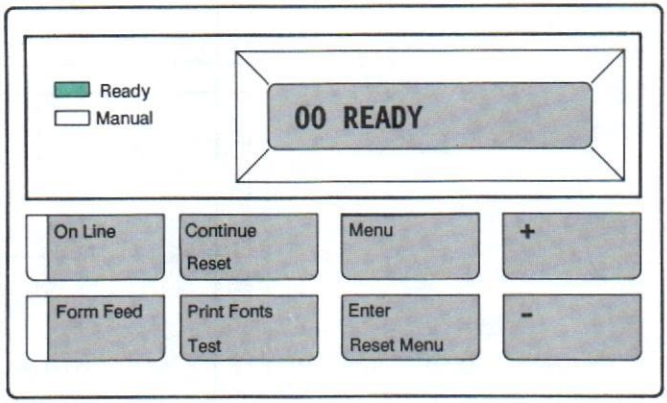


Figure 4-1. The Control Panel

Display

The display shows:

- *status messages* to keep you aware of the printer's current condition
- *attendance messages* to tell you to perform a necessary task before the printer continues to print
- *error or service messages* to let you know when the printer encounters difficulty
- *menu items* and their associated values or choices that you can select

Display messages can appear in any of five languages: English (the default), French, German, Italian, or Spanish. Refer to "Selecting the Local Language Display" on page 4-30 or to *Your Guide to Setting Up Your LaserJet III Printer* for instructions on changing the language.

Flashing Indicators

Flashing indicators mean the printer is receiving data or printing information stored in the buffer, or an operation is pending.

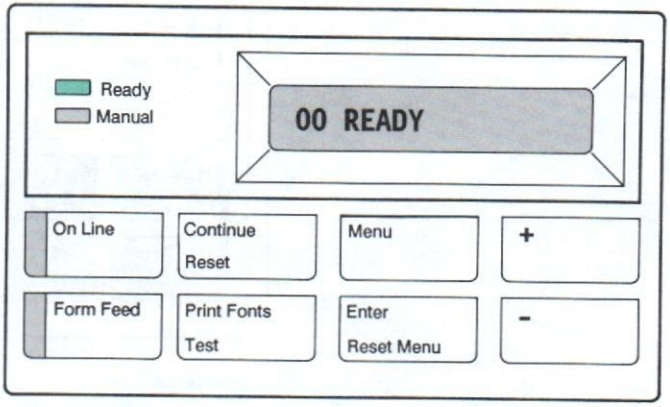


Figure 4-2. Control Panel Indicators

Ready Indicator

The green Ready indicator above [On Line] is lit when the printer is ready to print. When the light is flashing, the printer is receiving or processing data. When the ready indicator is off, an error or attendance message appears in the display. (For the printer to receive data, it must be both *on-line* and *ready.*)

Manual Feed Indicator

The amber Manual Feed indicator above [On Line] is lit when manual paper feed is selected. (See Chapter 5 to learn more about selecting manual feed.)

On Line Indicator

The amber light next to [On Line] is lit when the printer is on-line. (For the printer to receive data, it must be both *on-line* and *ready.*)

[On Line]

The printer can be switched between on-line and off-line by pressing [On Line] .

If you are sending data to the printer from your computer, the printer must be placed *on-line.* If you wish to use any other keys on the control panel, the printer must be *off-line.*

Form Feed Indicator

The amber indicator next to [Form Feed] is lit whenever page data is stored in the printer's memory.

When the printer is actively receiving or processing data, the Form Feed indicator is lit and the Ready light flashes on and off. When the printer is through processing data, the Ready light remains steadily lit. If the Form Feed indicator remains lit as well, there is still page data in the printer's memory that hasn't printed. Take the printer off-line and press [Form Feed] to print stored data.

Do not turn the printer off when the Form Feed indicator is lit, or you will lose the data stored in memory.

[Form Feed]

Pressing [Form Feed] tells the printer to print all the stored page data. Pressing [Form Feed] does not force a blank sheet through the printer. However, if the last page stored in the printer's memory is not a full page, and if your software does not send a command to print this data, take the printer *off-line* and press [Form Feed] to print it.

Note



Complex pages may take several minutes to process. Be sure the Ready indicator has stopped flashing (that is, the printer has finished receiving and processing data) before form-feeding the page.

Continue/Reset

Continue/Reset has two functions:

- Continue–Briefly pressing Continue clears most errors and returns the printer to on-line status. Continue overrides manual feed and paper size requests.
- Reset – Pressing and holding Reset until 07 RESET appears resets the printer. A reset returns all internal printer settings to the control panel selections. A reset also clears temporary soft fonts, temporary macros and stored page data from the printer's memory.

Print Fonts/Test

Print Fonts/Test has three functions:

- Font Printout – Briefly pressing Print Fonts prints pages of sample characters from the available fonts (internal, downloaded, and cartridge). See "The Font Printout" in Chapter 3 for a detailed description of the Font Printout.
- Self Test – Pressing and holding Test until 05 SELF TEST appears causes the printer to test its built-in controller. The self test also prints a page of test patterns and a list of the current printer settings. See "Understanding the Self-Test" on page 4-12 for an explanation of the printout.
- Continuous Self Test – Pressing and holding Test for 7 seconds (until 04 SELF TEST appears) causes the test page to print repeatedly until stopped. Continuous printouts allow you to check print density over several pages. To stop the printouts, press On Line. See "Understanding the Self-Test" on page 4-12 for an explanation of the printout.

Menu

Menu accesses the Printing Menu and the Configuration Menu.

- Briefly pressing Menu enters the Printing Menu. (COPIES=1* appears.) See "The Printing Menu", beginning on page 4-14.

- Pressing and holding Menu for about 5 seconds until AUTO CONT=OFF * appears enters the Configuration Menu. See "The Configuration Menu", beginning on page 4-20.

After you enter a menu, briefly pressing Menu steps you through the menu items.

Enter/Reset Menu

Enter/Reset Menu has two purposes:

- Enter – When you are in a menu, briefly pressing Enter saves the menu selection. An asterisk (*) appears in the display to indicate current menu selections.
- Reset Menu – Pressing and holding Reset Menu until 09 MENU RESET appears returns the Printing Menu items to the factory default settings listed in Table 4-3 on page 4-27. It also clears temporary soft fonts, temporary macros, and stored page data. (You must be off-line – and out of any menus – to reset the Printing Menu.)

+ and –

These two keys display the next or previous value for the current menu item. For example, if the display shows COPIES=3, pressing + changes the message to COPIES=4. Pressing – changes the message to COPIES=3 again.

Holding down either of these keys scrolls through all the choices available for that menu item.

Using Control Panel Keys and Indicators

The control panel directs certain printer operations, such as taking the printer off-line, running a print test, and selecting menu items.

The printer must be *off-line* before you can use any key except [On Line] . When you finish making menu selections, press [On Line] to put the printer back *on-line* to continue printing.

Using Keys with More Than One Function

Some keys on the control panel have more than one function. The length of time you press and hold these keys determines which functions you access. These keys are:

- [Continue/Reset]
- [Print Fonts/Test]
- [Enter/Reset Menu]

Momentarily pressing a control panel key executes the command listed on the top of the key.

Holding down some control panel keys for 3 to 5 seconds executes the command listed on the bottom of the key.

In the rest of this chapter, the word *press* indicates that you should *momentarily* press the key. The phrase *press and hold* means you should hold down the key (usually for 3 to 5 seconds), wait for a particular message to appear, and then proceed to the next step.

Saving Menu Selections

Pressing [Enter] saves your menu selection (and resets the printer internally) after you make control panel changes to the Printing Menu or Configuration Menu.

If the printer contains any buffered data, temporary fonts, or temporary macros, the message `10 RESET TO SAVE` appears in the display when you exit the menu. If you see this message, the printer does not *automatically* save selections. You can do one of the following:

- Press and hold [Reset] to reset the printer and save your new selections. Although your new selections are saved, buffered data (*temporary* fonts, macros, and unprinted pages) is erased.
- Press [Continue] to keep the printer off-line without resetting. Your selections are not saved until the next reset.
- Press [On Line] to keep the printer on-line without resetting. Although your selection is saved, it remains inactive until you reset the printer.

Note



Resetting your printer does not erase permanent soft fonts or macros from memory – only temporary soft fonts and macros. Generally, permanent soft fonts or macros remain in the memory until overwritten, deleted by software command, or until the printer is turned off.

Running the Printer Self Test

1. Take the printer off-line.
2. Press and hold [Test] until 05 SELF TEST appears in the display. This takes about three to five seconds.

 All control panel indicators light up during the self test. The internal testing lasts approximately 30 seconds, longer if optional memory has been added. When finished, the printing portion of the test begins and 06 PRINTING TEST appears in the display. When the test finishes, 00 READY appears. (If an error occurs during the test, an error message is displayed. See Chapter 7 for a listing of error messages.)
3. Press [On Line] to return the printer on-line again.

Stopping the Self Test

You can stop the self test by pressing [On Line] or [Continue] or [Print Fonts/Test] while the display still reads 05 SELF TEST. The control panel indicators will extinguish and the 05 portion of the message will blink for several seconds. If you pressed [On Line] or [Continue] the printer will return on-line.

If you wait until 06 PRINTING TEST appears in the display, the self test will complete before returning on-line.

Running the Continuous Self Test

The continuous self test causes test pages to be printed repeatedly until you stop it by pressing [On Line].

1. Take the printer off-line.
2. Press and hold [Test] longer (about six or more seconds) until 04 SELF TEST appears.

 All control panel indicators light up during the continuous self test. The internal testing lasts approximately 30 seconds (longer if optional memory has been added). When finished, the Form Feed and Ready indicators remain lit, and the printing portion of the test begins.

Stopping the Continuous Self Test Printout

You can stop the continuous self test printout by pressing [On Line] or [Continue] or [Print Fonts/Test]. The control panel indicators will extinguish and the 04 portion of the message will blink for several seconds. If you pressed [On Line] or [Continue], the printer will return on-line.

The continuous self test does not stop printing as soon as [On Line] is pressed. Up to six additional pages may print before the printer goes back on-line.

Understanding the Self Test

Use the self test printout to verify control panel selections and to help determine print quality. Figure 4-3 shows the self test printout.

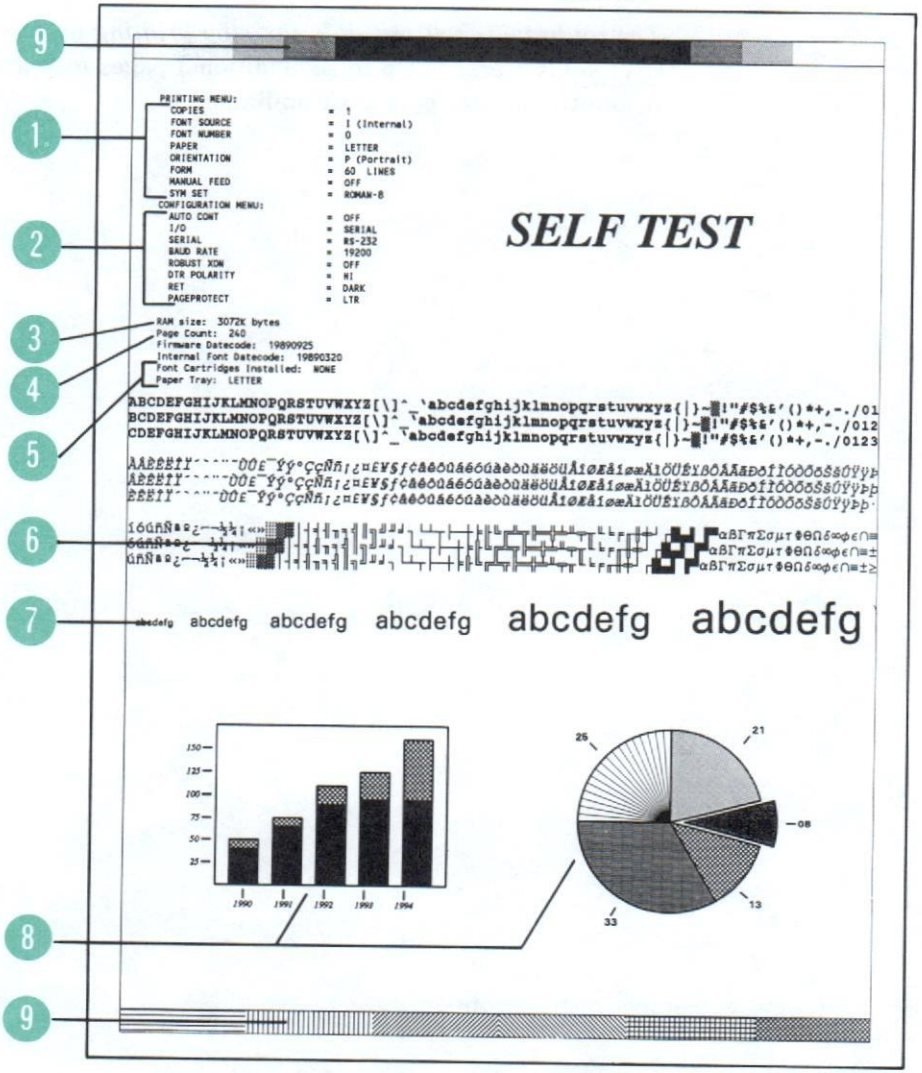


Figure 4-3. Self Test Printout

The elements of the self test printout are:

1. **Printing Menu** shows the current Printing Menu selections in the order they appear in the control panel display.
2. **Configuration Menu** shows the current Configuration Menu selections in the order they appear in the control panel display.
3. **RAM size** shows the amount of installed printer memory. 1024 Kbytes of installed memory are standard with the printer. If you install an optional memory board, a self test can be used to verify proper installation. Figure 4-3 shows 3072 Kbytes of memory, indicating that two Mbytes of additional memory have been installed.
4. **Page Count** shows approximately how many pages have been printed. You can use the page count to see when to change the ozone filter and to track printer usage. The page count is current as long as the printer is powered on. When the printer is powered off, the page count is rounded-down to the nearest 10 page increment and recorded in memory.
5. Use this area of the self test to verify the installation of your font cartridges, options and paper trays.
6. Use the ripple print pattern to check print density and quality.
7. This line demonstrates the printer's ability to print with scalable typefaces.
8. The bar graph and pie chart test the printer's HP-GL/2 vector graphics capability. (The pie chart also serves as a check on the Resolution Enhancement quality. See the *Resolution Enhancement* section in this chapter.)
9. Use the shading and cross-hatch patterns in the borders to check the print density and quality.

The Printing Menu

The Printing Menu includes these items:

- Number of copies
- Font source
- Font number
- Point size (or pitch)
- Paper (or envelope) size
- Orientation
- Form (lines-per-page)
- Manual feed
- Symbol set

To enter the Printing Menu, take the printer off-line and briefly press (Menu) . `COPIES=1*` appears in the control panel display.

Note



Most software selects the Printing Menu items discussed in the following section. If you know that your software allows you to specify these menu items (such as number of copies, font changes, etc.), you do not need to read this section further.

Printing Multiple Copies

You can print up to 99 uncollated copies. For example, if you are printing a three-page document and you set `COPIES=2`, the printer produces two copies of the first page, then two copies of the second page, then two copies of the last page.

Selecting a Default Font

The FONT SOURCE and FONT NUMBER menu items allow you to select your default font. If you not know the source and font number, print a font list (see the "Producing a Font Printout" section earlier in this chapter) to find out.

Note



The display identifies only the sources of fonts currently available. If no font cartridges are installed, the L and R will not display. If no permanent soft fonts are downloaded, S will not display. The letter must match the alpha portion of the Font # on the Font Printout.

If you change to a new symbol set, the control panel font selection returns to the factory default setting. You must then reselect your font using the Printing Menu as described above. Because font numbers change, be sure to check the font number on the new Font Printout.

Changing Point Size and Pitch

If the font indicated by your FONT SOURCE and FONT NUMBER selections is a scalable typeface with *proportional-spacing*, the Printing Menu allows you to select a *point size*. **Point size** is a measure of the vertical height of a character (including some white space above and below) in $\frac{1}{72}$ of an inch. Your printer adjusts the character's horizontal spacing according to the point size you select.

If the font indicated by your FONT SOURCE and FONT NUMBER selections is a scalable typeface with *fixed-spacing*, the Printing Menu allows you to select a *pitch*. **Pitch** is a measure of the number of characters printed in a horizontal inch. Your LaserJet III printer adjusts the height (point size) of resulting characters according to the pitch you select.

(Refer to Chapter 3, "Fonts", for an explanation of fixed versus proportionally-spaced fonts.)

Setting the Paper (or Envelope) Size

The printer control panel allows you to select from four sizes of paper and four sizes of envelopes as shown in Table 4-1.

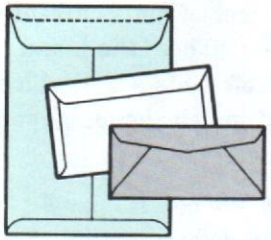


Table 4-1. Paper and Envelope Sizes

Paper	Physical Size	Printable Area	Tray Part Number
Letter	8.5 x 11 in.	8.0 x 10.6 in.	92297B
Legal	8.5 x 14 in.	8.0 x 13.6 in.	92297C
A4	210 x 297 mm	198 x 287 mm	92297D
Executive	7.25 x 10.5 in.	6.75 x 10.1 in.	92297E
Envelope:			92297F
COM-10	$4\frac{1}{8}$ x $9\frac{1}{2}$ in.	3.6 x 9.1 in.	
Monarch	$3\frac{7}{8}$ x $7\frac{1}{2}$ in.	3.4 x 7.1 in.	
DL	110 x 220 mm	98 x 210 mm	
C5	162 x 229 mm	150 x 219 mm	

Setting the Page Orientation

Orientation refers to the direction of print on a page. Printing across the short-edge width of a page is **portrait** orientation and printing across the long-edge length of a page is **landscape** orientation. The LaserJet III printer also allows you to print in **reverse portrait** and **reverse landscape** orientations.

Figure 4-4 shows all four orientations on the page.

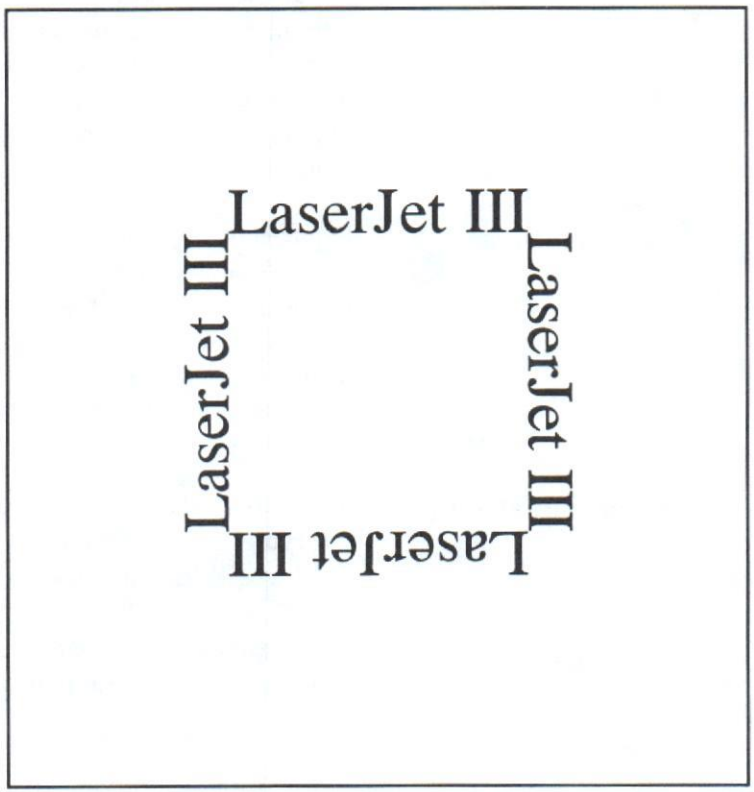


Figure 4-4. Orientation

With the LaserJet III printer, all fonts are available in all orientations through the font rotation feature. (See "The Font Rotation Feature" in Chapter 3.) For example, if you want to print in landscape orientation and the font

you select appears only in the portrait portion of the Font Printout, the printer automatically rotates the font into the landscape orientation.

Setting the Number of Lines Per Page

The Printing Menu item FORM controls the distance between lines on the page and also the number of lines per page. FORM sets the distance between lines by setting the Vertical Motion Index (VMI). FORM places the first line of text at the top margin, the last line of text at the bottom margin, and spaces the remaining lines equally between them. (See the *LaserJet III Printer Technical Reference Manual* for information on VMI and how the page length, text length, and line spacing printer commands interact with the FORM setting.)

Note



If your control panel is set to a specific number of lines per page, and your software is set to a greater number of lines per page, the top margin of each page printed is successively lower. To correct this **creeping text** problem, make sure that the text-length setting of your software matches the FORM setting on the control panel.

Selecting Manual Feed

Manual feed allows you to print on envelopes and paper of varying sizes and types. For specific instructions on printing with manual feed, refer to Chapter 5.

Note



The maximum paper size which you can manually feed is 8.5 in. by 14 in. The minimum size is 3.9 in. by 7.5 in.

Selecting a Symbol Set

A **symbol set** is a collection of alphabetic, numeric, punctuation and special-purpose symbols. See Chapter 3 for more information. The LaserJet III printer provides 35 choices of symbol sets.

Table 4-2 shows the internal symbol sets you can select from the control panel.

Table 4-2. LaserJet III Selectable Symbol Sets

Internal Scalable Typefaces and Bitmapped Fonts	
Roman-8	ECMA-94 Latin 1
PC-8	PC-8 D/N
PC-850	Legal
ISO-*nn**	German
Spanish	
Internal Scalable Typefaces Only	
VN Math	VN Intl
VN US	PS Math
PS Text	Math-8
PI Font	MS Publ
Windows	DeskTop

* *nn*=2, 4, 6 (US ASCII), 10, 11, 14, 15, 16, 17, 21, 25, 57, 60, 61, 69, 84, or 85.

The Font Printout shows all symbol sets for installed cartridges and downloaded soft fonts. Internal bitmapped font symbol sets are only shown in Roman-8, ECMA-94 Latin 1, PC-8, PC-8 D/N, PC-850, and Legal. The remaining selectable internal symbol sets appear on the Font Printout only if selected as the default symbol set from the control panel.

See Appendix A for symbol set tables and character identification.

The Configuration Menu

The Configuration Menu includes these items:

- Auto continue
- Interface type and configuration
- Resolution Enhancement
- Page Protection

You set these menu items when you first installed the printer using *Your Guide to Setting Up Your LaserJet III Printer*. Normally, you do not need to change these menu items.

To enter the Configuration Menu, take the printer off-line, then press and hold down (Menu) for about 5 seconds until `AUTO CONT=OFF *` appears in the display.

Auto Continue

Auto continue refers to the way several error messages are handled:

1. When you select `AUTO CONT=OFF`, an attendance or error message remains in the display until you correct the problem, tell the printer to continue, or both. For example, if the `20 MEM OVERFLOW` message appears, the printer *stops printing* until you press (Continue) to return the printer on-line.
2. When you select `AUTO CONT=ON`, most error messages appear on the display for only about 10 seconds. Then, the `00 READY` message appears and the printer resumes printing.

Note



We recommend you operate the printer with `AUTO CONT=OFF` so that you have the opportunity to review messages and make corrections. (See Chapter 7.) If your printer is part of a network, remote or spooling system, set `AUTO CONT=ON`.

Choosing Interfaces

You can configure the printer for a wide variety of computers. The four types of interfaces are:

- RS-232-C (serial)
- RS-422A (serial)
- Parallel (Centronics)
- Optional (appears in the Configuration Menu only if a hardware device is installed)

Note



The parallel interface that comes with your printer is a **Centronics parallel** interface. References to a "parallel interface" throughout this manual imply the Centronics parallel interface.

Determine whether you will be using a serial or a parallel interface and then use the appropriate configuration instructions.

If you have installed an interface in the optional interface slot, the printer can be configured to operate with that interface.

Parallel Interface

Use a parallel interface when your printouts contain large amounts of graphic data or when frequently transferring soft fonts to the printer. A parallel interface is faster than a serial interface, but the cable length from the printer to the computer is limited to 10 feet.

Your printer comes configured for a parallel interface as the factory default.

RS-232-C Serial Interface

Use a serial interface when you are most often sending text with very little graphic data to the printer, or when you need to locate your printer more than 10 feet (and up to 50 feet) from your computer.

RS-422A Serial Interface

Use the **RS-422A interface** for extremely long distance communications (up to 4000 feet). If your computer uses an RS-422A interface, you will need to select RS-422 from the printer control panel. If you are not sure which serial interface your computer has, it is probably an RS-232-C interface.

Choosing an Optional Interface

Serial and parallel are the most common interfaces; however, special optional interfaces are available for hardware devices such as print spoolers. When using the optional I/O slot, ensure that your device is specifically designed to work with the LaserJet III printer. If you are unsure, contact your interface manufacturer.

Caution



Hewlett-Packard assumes no liability for any damage resulting from the use of a non-HP optional interface. Before installing a non-HP interface in the optional interface slot, you may want to insure that the interface manufacturer or supplier will assume the potential risks involved.

Resolution Enhancement

Resolution Enhancement refines the print quality of characters and graphics by "smoothing" the fine gradations along the edge of the printed image. This process sets a new standard of print quality for 300 dpi (dots per inch) printing.

Figure 4-5 illustrates two magnified images, one with Resolution Enhancement set to `OFF` and the other set to `MEDIUM`.

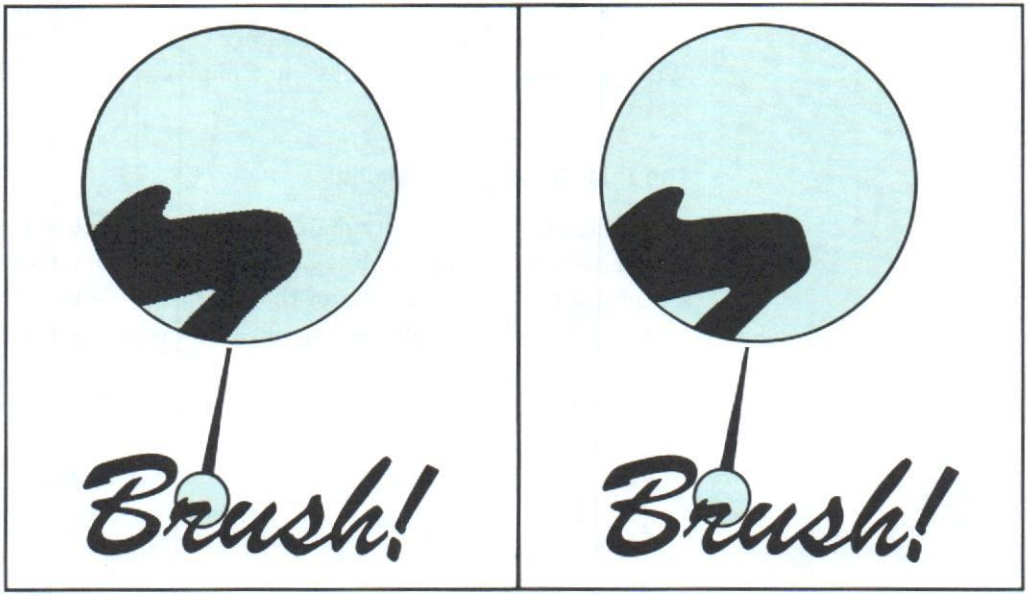


Figure 4-5. Resolution Enhancement Examples

The Resolution Enhancement option has four choices: *dark, medium, light,* and *off*. The factory default setting is `MEDIUM`. You may discover that a different setting, such as `DARK`, works better for your printer. Experiment with different selections to see which option produces the best results for you.

Caution



Some interface boards from vendors other than HP are not compatible with Resolution Enhancement. Examples are the Intel[R] Visual Edge and the DP-Tek LaserPort and LaserPort GrayScale. When using one of these, you should set Resolution Enhancement to `OFF`.

You can see the effects of the different settings by examining the pie chart in the printer self test. In the 33% slice, look for dark or light vertical stripes in the gray shading. In the 25% slice, look for the stroke consistency along the radial lines. Refer to "Adjusting Print Density With Resolution Enhancement" in Chapter 6 for detailed instructions.

The Print Density Adjustment

Adjusting the print density dial affects the amount of toner placed at points along the line or image edges. Refer to Chapter 6 for an explanation of the interaction between Resolution Enhancement and the print density adjustment.

Page Protection

A page's complexity (rules, vector graphics, or dense text) may exceed the printer's ability to create the image and keep pace with the engine printing process. If a page is too complex, the page might print in parts, or only part of the page might print. Some print data loss is likely. In such cases, a 21 PRINT OVERRUN message (signifying possible loss of print data) appears in the display. (Refer to the error message explanation in Chapter 7.)

Page protection reserves additional memory for the page image process, allowing the printer to create the entire page image (in memory) before physically moving the paper through the printer. This process ensures that the entire page will be printed. You can set page protection for LTR (letter), A4, or LGL (legal) sized pages. Set page protection for the size you expect to use most often.

Page protection appears as a Configuration Menu option only if you have at least 1 Mbyte of optional memory installed. The printer's memory is reconfigured every time you change the page protection level. With 1 Mbyte installed, changing page protection changes the available user memory and print image memory as follows:

Page Protection	User Memory	Image Memory
OFF	1744 Kbytes	191 Kbytes
LTR/A4	896 Kbytes	1040 Kbytes
LGL	702 Kbytes	1234 Kbytes

Note

The printer erases all downloaded fonts (including permanent fonts) and all macros (including permanent macros) when memory is reconfigured for page protection. You must reload any fonts and macros you need.

Unlike other control panel selections, you do not need to return the printer on-line. As soon as you press (Enter) to make your selection, 17 MEMORY CONFIG appears in the display, indicating the printer memory is being reconfigured for (or from) page protection. The printer then performs an internal self-test and automatically returns on-line.

Using the Menu Default Settings

The two types of printer default settings are:

- Factory default settings
- User selectable settings

The term **default** refers to the settings the printer uses unless you send printer commands via software to change them.

Factory Default Settings

The LaserJet III printer uses the factory default settings until you change them. Factory default settings are permanently stored in the printer's memory.

To return the Printing Menu to the factory default settings, press and hold (Reset Menu) until 09 RESET MENU appears.

Tables 4-3 and 4-4 show the factory default settings for the Printing Menu and Configuration Menu.

Selectable Settings

You can change the menu defaults to match your printing needs. When you enter a value for a menu item, it becomes the selectable setting. The printer uses it in place of the factory default, even after you turn the printer off and back on again.

Tables 4-3 and 4-4 show the range of user selections on the Printing Menu and Configuration Menu.

Table 4-3. Control Panel Selectable Settings — Printing Menu

MENU ITEM	FACTORY DEFAULT	RANGE OF USER SELECTED ITEMS
COPIES	1	1 through 99
FONT SOURCE	Internal	Internal, Left or Right cartridge, Soft fonts
FONT NUMBER*	0	0 through 999
PT. SIZE**	12.00	4.00 to 999.75 points
PITCH**	10.00	0.44 to 99.99 cpi
PAPER (or ENVELOPE)	Letter	Letter, Legal, Exec or A4 (COM-10, Monarch, DL or C5)
ORIENTATION	Portrait	P (portrait) or L (landscape)
FORM	60	5 through 128 lines per page
MANUAL FEED	Off	On or Off
SYM SET	Roman-8	See Table 4-2* on page 4-19.

*See "The Font Printout" in Chapter 3 for an explanation.

**This menu item appears only if applicable to a selected scalable typeface.

Note

Any Printing Menu setting you select stays in effect as a default until you restore it to the factory setting or you manually change it using the control panel.

Software commands override Printing Menu selections (for example, a software command setting the orientation to `LANDSCAPE` overrides a control panel setting of `PORTRAIT`). Software command settings remain in effect until changed or until you reset the printer.

Software changes override the menu settings and do not appear on the control panel display.

Table 4-4.
Control Panel Selectable Settings — Configuration Menu

MENU ITEM	FACTORY DEFAULT	RANGE OF USER SELECTED ITEMS
`Auto Cont`	Off	Off, On
`I/O`	Parallel	Parallel, Serial, Optional*
`Serial`**	RS-232	RS-232, RS-422
`Baud Rate`**	9600	300, 600, 1200, 2400, 4800, 9600, 19200
`Robust Xon`**	On	On, Off
`DTR Polarity`**	Hi	Hi, Low
`RET`	Medium	Dark, Medium, Light, Off
`Pageprotect`†	Off	Off, Ltr, Lgl, A4

* Appears only if an optional I/O card is installed.

** Appears only if Serial I/O is selected.

† Appears only if optional memory is installed.

Selecting Menu Items

Using (Menu), you can access the Printing Menu and the Configuration Menu of your LaserJet III. These menus let you select items that control the printer. The following procedure allows you to select any menu item:

1. Press (On Line), if necessary, to take the printer off-line.
2. To change a setting on the Printing Menu, press the (Menu) key to display `COPIES=01*` in the display window. To change a setting on the Configuration Menu, hold down (Menu) until `AUTO CONT=` appears in the display window.
3. Press (Menu) as many times as necessary to display the menu item you want to change.
4. Press (+) or (−) to select the value for that menu item.
5. Press (Enter/Reset Menu) to save your selection. An asterisk (*) appears after your choice.
6. Press (Menu) until `00 READY` appears in the display window. (If the message `10 RESET TO SAVE` appears in the display, hold down (CONTINUE\RESET) until `07 RESET` appears. This saves your selection as the new default.)

Selecting the Local Language Display

The local language selection appears in the display when you press (Enter) while powering the printer off and then on again. You normally set the local language the first time you install the printer. See *Your Guide to Setting Up Your LaserJet III Printer.*

1. Power the printer OFF by pressing the power switch at the rear of the printer to the OFF position. Leave the printer off for several seconds.
2. Hold down (Enter/Reset Menu) while pressing the power switch to the ON position again, until `CONFIG LANG` appears in the display.
3. Release (Enter/Reset Menu) . The message `CONFIG LANG` disappears, and is replaced by the message `05 SELF TEST`. During this time all indicators are lit.
4. Once the self test completes, the message `LANGUAGE=ENG` appears in the display. Press (+) or (−) to scroll through the other language options (French, German, Italian and Spanish).
5. When your choice appears in the display, press (Enter) . An asterisk (*) appears beside the selection.
6. Press (On Line) to save your selection and return the printer on-line.

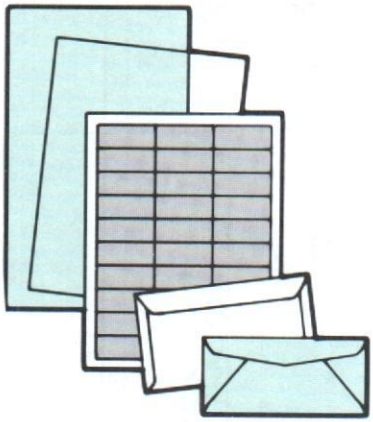
Note



If you do not select a specific language option by pressing (Enter) (step 5), the printer will default to English. Thereafter, you will be prompted for a language selection every time you power the printer ON until you make a specific choice.

5

Special Printer Operations



You can use your LaserJet III printer for many more printing operations than standard $8\frac{1}{2}$ x 11, portrait orientation pages. You can:

- Print in different orientations.
- Send your output to stack either face-down in correct order or face-up in reverse order.
- Print on non-standard sizes and weights of paper using the manual feed feature.
- Print directly on overhead transparencies.
- Print sheets of adhesive labels.
- Print envelopes.
- Print from different paper trays in legal, executive or A4 sizes.

Each of these features is described in this chapter.

Setting the Page Orientation

Page orientation refers to the direction of print on the page. Using the LaserJet III printer, you can print across the page width (portrait and reverse portrait orientation). You can also print across the page length (landscape and reverse landscape orientation).

Many software applications allow you to select which orientations to use. Refer to your software documentation for instructions.

You can also select page orientation by sending these printer commands, either directly or by embedding them in your text:

- $^{E}_{C}$&ℓØO – Sets Portrait Orientation
- $^{E}_{C}$&ℓ1O – Sets Landscape Orientation
- $^{E}_{C}$&ℓ2O – Sets Reverse Portrait Orientation
- $^{E}_{C}$&ℓ3O – Sets Reverse Landscape Orientation

Figure 5-1 shows the four orientations.

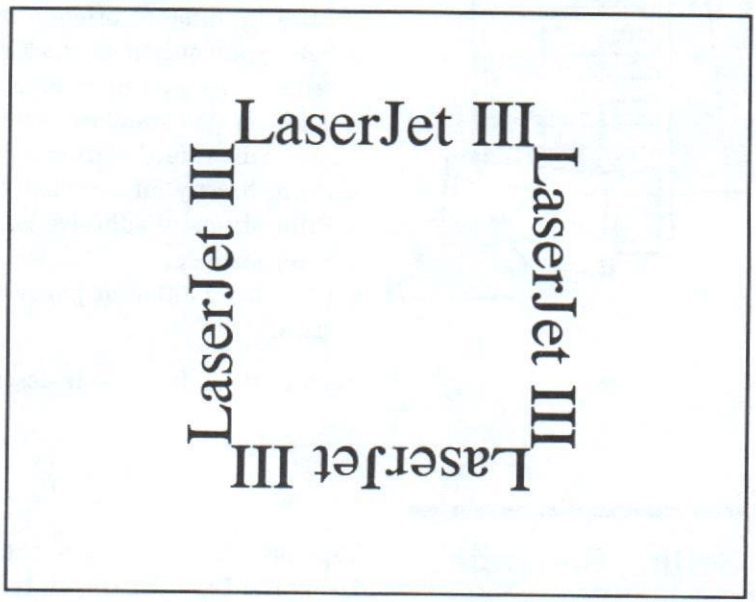


Figure 5-1. The Four Orientations

You can also select regular portrait or landscape orientation from the control panel Printing Menu. (Reverse portrait and reverse landscape can be selected only by your software application or by printer commands.)

If you change page orientation in the middle of a job, the data sent prior to the command will be printed on

a separate page. Changing the page orientation returns all margins and the lines-per-inch setting to the default settings.

Portrait orientation is the printer's factory default setting.

Example - Printing a Spreadsheet in Landscape Orientation Using Lotus 1-2-3

A common application for landscape orientation is printing spreadsheets. This example shows how to print a Lotus 1-2-3 spreadsheet in the landscape orientation.

1. Take your printer off-line.
2. Press and hold (Reset Menu) until 09 MENU RESET appears in the display.
3. Load the Lotus 1-2-3 program.
4. Press [/] [F]ile [R]etrieve.
5. Enter the file name of the spreadsheet to be retrieved and press (RETURN) on your computer keyboard.
6. Press [/] [P]rint [P]rinter [O]ptions [S]et-up and enter the printer command for Landscape, $^{E}_{C}$&ℓ1O, as shown below:

 \Ø27&ℓ10

 (Lotus 1-2-3 recognizes \Ø27 as the code for the escape character $^{E}_{C}$)
7. Verify that you have entered the command properly, then press (RETURN).
8. Press [P]age Length, enter 45 and press (RETURN).
9. Press [M]argins [R]ight, enter 106 and press (RETURN).
10. Press [Q]uit.
11. Press [R]ange, enter the desired print range and press (RETURN).
12. Return your printer to on-line.
13. Press [A]lign and [G]o to print the spreadsheet.

Note



Lotus 1-2-3 does not send a form feed command to the printer following the end of data. Therefore, you may need to take the printer off-line and press Form Feed to eject the last page of your spreadsheet. You can also use the [P]age command in the printer menu.

Selecting Output Order

You can choose to have your printed pages stack in either of two arrangements:

- **Correct order** – pages exit the printer to the top output tray and stack face-down. (This is the typical output order).
- **Reverse order** – pages exit the printer to the face-up output tray and will stack face-up, in reverse order (that is, the last page printed comes out on top).

Caution



When printing on label stock, transparencies, or envelopes, always use the face-up (reverse order) output tray to avoid excessive curling, severe paper jams, and potential damage to the printer.

To open the face-up output tray:

1. Ensure there is sufficient clearance behind the printer to output and stack the media you'll be printing on. If necessary, shift the printer slightly to one side to gain clear access to the rear of the printer.
2. Reach behind the printer and touch the press-and-release latch located near the top center of the back of the printer (refer to Figure 5-2). The door springs open. Lower the tray to its resting position and extend the folded panel fully outward (refer to Figure 5-3).

Printer output exits to the face-up output tray, face up and in reverse order, as long as the tray is in the open position. To restore correct order output, fold in the tray extension, raise the face-up output tray fully upright and close it. Output again exits to the top tray.

Caution



Do not open or close the face-up output tray during printing, as the printer may jam.

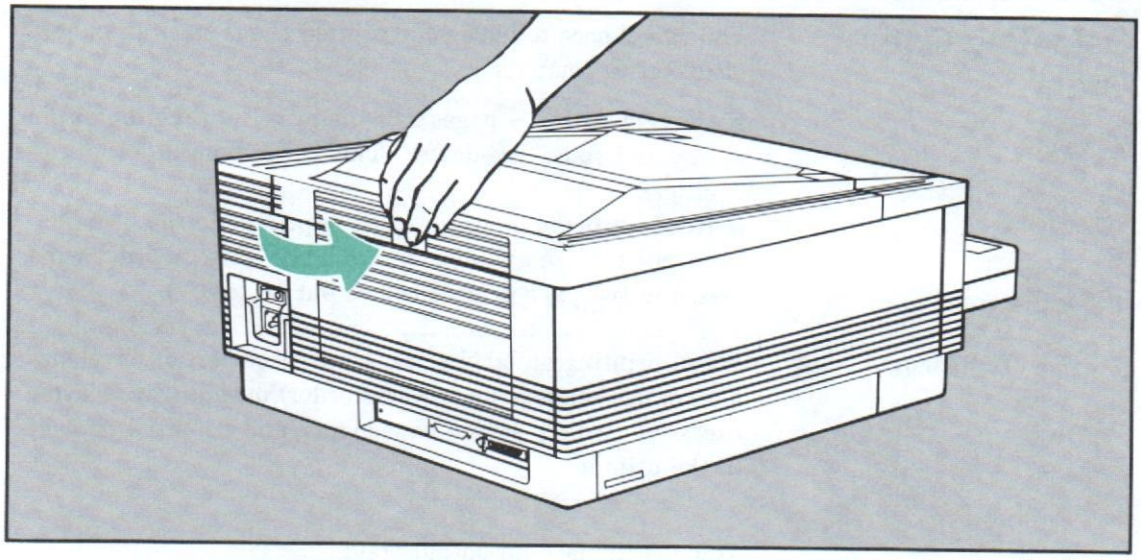


Figure 5-2. Locating the Face-up Output Tray Release Latch

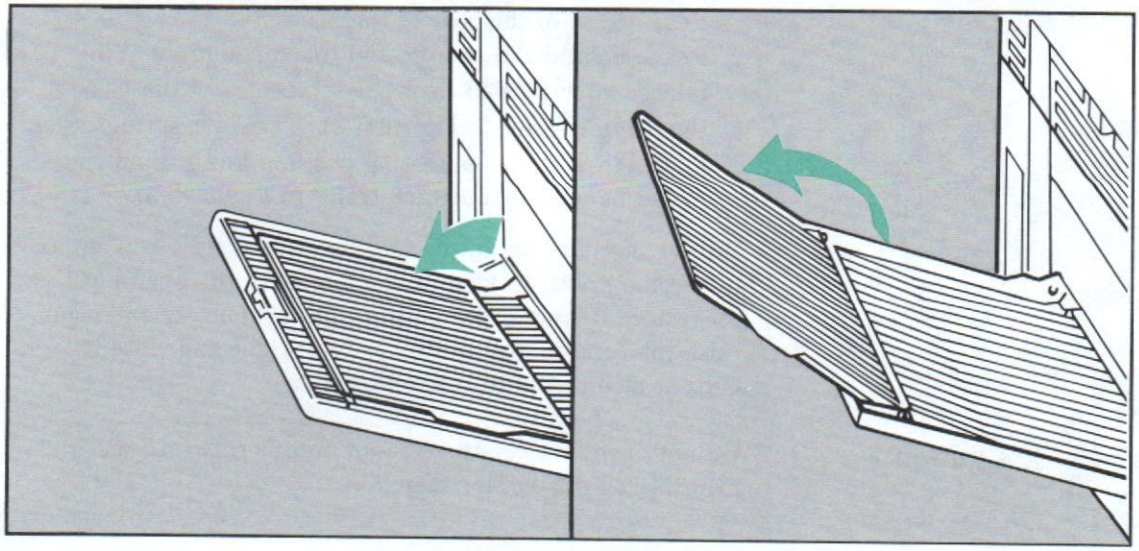


Figure 5-3. Opening the Face-up Output Tray

Using Manual Feed

The manual feed feature allows you to:

- print non-standard sizes of paper, envelopes, labels and transparencies.
- print an occasional page of special paper (such as letter-head) without having to load a paper tray.
- print small volumes of special media.

You can manually feed media within the following size ranges:

	Metric	English
minimum width	90 mm	$3\frac{1}{2}$ in.
maximum width	216 mm	$8\frac{1}{2}$ in.
minimum length	190 mm	$7\frac{1}{2}$ in.
maximum length	356 mm	14 in.

Many software applications allow you to specify manual feed directly; refer to the *Software Application Notes* and to your software's documentation. You can also print using manual feed by sending a printer command from your software, or by selecting the feature from the control panel.

Note



Manual feed operations work best if at least two sheets of paper remain in the paper tray. If the paper tray is empty or too full, your paper may not feed correctly.

Manually Printing Single Sheets

You can print single pages of the same size (such as letterhead stationery) without first setting manual feed. Follow the manual feed instructions to adjust the paper guides and insert the media fully forward in the paper tray. When the printer receives data it will select the media from the manual feed tray.

If you print multiple sheets (or envelopes or other media) it is best to first set manual feed.

Selecting Manual Feed Using Printer Commands

Select manual feed by sending this printer command:

$^{E}_{C}$&ℓ2H

Return to automatic tray feed by sending this printer command:

$^{E}_{C}$&ℓ1H

Selecting Manual Feed From the Control Panel

You can also select manual feed from the control panel as follows:

1. Take the printer off-line.
2. Press (Menu) several times until `MANUAL FEED=OFF *` appears in the display.
3. Press (+) to display `MANUAL FEED=ON`.
4. Press (Enter) to set your manual feed selection. (An * appears in the display.)
5. Press (On Line) to exit the Printing Menu and return the printer on-line.

Printing Using Manual Feed

To print using manual feed:

1. Select manual feed using a printer command or from the control panel. The Manual indicator lights.
2. Send data from the computer to the printer. (The printer goes off-line and the Form Feed indicator lights up. `PF FEED LETTER` appears in the display.)
3. Adjust the manual feed guides to the width of the media (Figure 5-4).

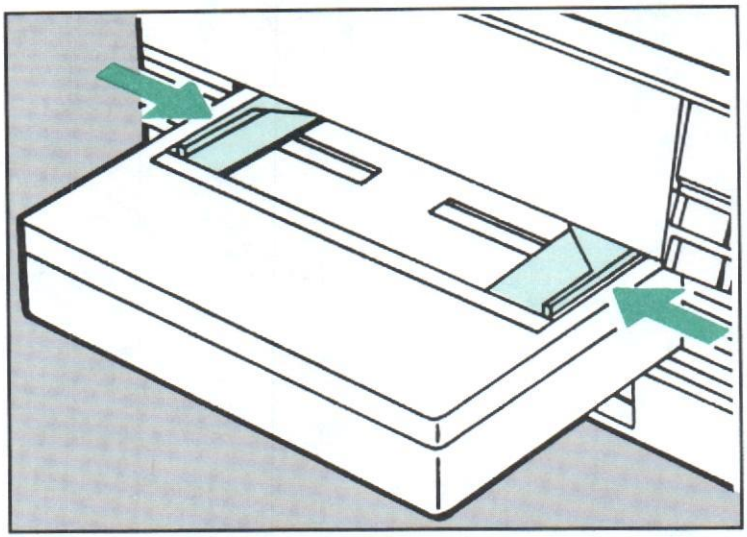


Figure 5-4. Adjusting the Manual Feed Guides

4. Slide a sheet of paper into the top of the paper tray between the manual feed guides until it stops (Figure 5-5). *For letterhead stationery, the letterhead edge should be inserted first, face up.*
5. After a momentary pause, the On Line indicator lights and the page is pulled into the printer. If your job requires more than one sheet of paper, wait until `PF FEED LETTER` appears in the display before inserting the next sheet of paper. Repeat this process until your job is done.
6. Exit manual feed by changing your software setting, by printer command, or by resetting the Printing Menu to `MANUAL FEED=OFF *`.

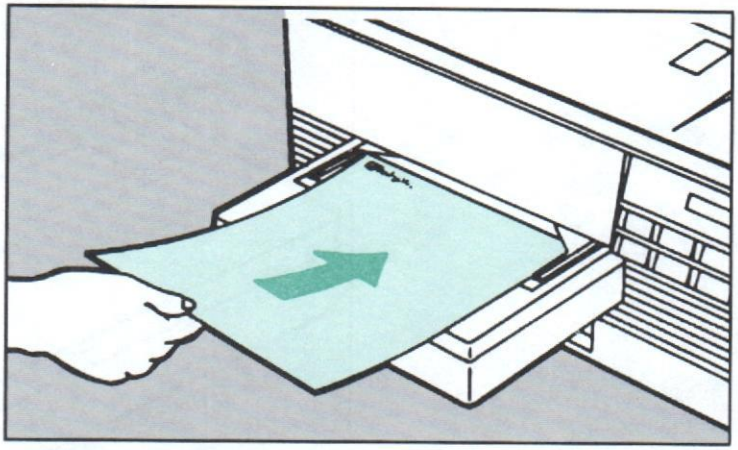


Figure 5-5. Manually Feeding Paper

Manually Feeding Legal-Sized Paper

If a legal-size paper tray is not available, follow these instructions to manually feed legal-sized pages:

1. Take the printer off-line.
2. Press [Menu] repeatedly until `PAPER=LETTER*` appears in the display.
3. Press [+] once. `PAPER=LEGAL` appears in the display.
4. Press [Enter] to set the legal-sized paper selection. (An * appears in the display).
5. Press [Menu] until `MANUAL FEED=OFF*` appears in the display.
6. Press [+] to display `MANUAL FEED=ON`.
7. Press [Enter] to set the manual feed selection. (An * appears in the display. The Manual Feed indicator on the display also lights.)
8. Press [On Line] to exit the Printing Menu and return the printer on-line.
9. Send data to the printer.
10. The printer goes off-line and `PF FEED LEGAL` appears in the display.
11. Insert a legal sheet of paper between the manual feed guides. Adjust the guides to the size of the paper (Figure 5-4). Slide the paper into the printer until it

stops (Figure 5-5). The printer automatically picks up the sheet and prints.

To return to automatic feed, change MANUAL FEED back to OFF in your software application, by printer command, or by changing the setting at the control panel.

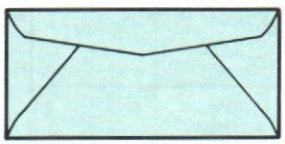
Manually Feeding Envelopes

You can manually feed and print envelopes if you don't have a special envelope tray. Monarch, COM-10, C5 or DL envelopes are the standard sizes.

To format correctly, envelopes must be printed in landscape orientation.

Note

Because of the various paper folds that make up an envelope, it is difficult to find envelopes that will yield good print quality and not cause paper jams. Refer to Appendix D for help in selecting a satisfactory envelope for your needs.



Example - Manually Feeding a COM-10 Envelope Using Printer Commands

1. Use your software application to enter the following combined printer command:

 $^{E}_{C}$&ℓ#a3h1O

 where # = envelope code. Substitute the appropriate envelope code for the # symbol in the printer command (see Table 5-1). Use 81 for a COM-10 envelope. In this example, then, the proper printer command is:

 $^{E}_{C}$&ℓ81a3h1O

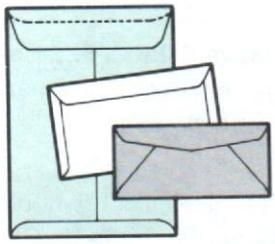


Table 5-1. Envelope Commands

Envelope	Size	Embed this # in command
Monarch	$3\frac{7}{8}$in. x $7\frac{1}{2}$in.	80
COM-10	$4\frac{1}{8}$in. x $9\frac{1}{2}$in.	81
DL	110mm x 220mm*	90
C5	162mm x 229mm*	91

*sizes may vary slightly with manufacturer

2. Now enter the addresses. (Make sure you allow for a small margin between the top and left edge of the envelope and the "from" address. Printing very close to the edge of the envelope will result in poor print quality. Refer to your software's documentation or the *Software Application Notes* for more information on preparing data for envelopes.)

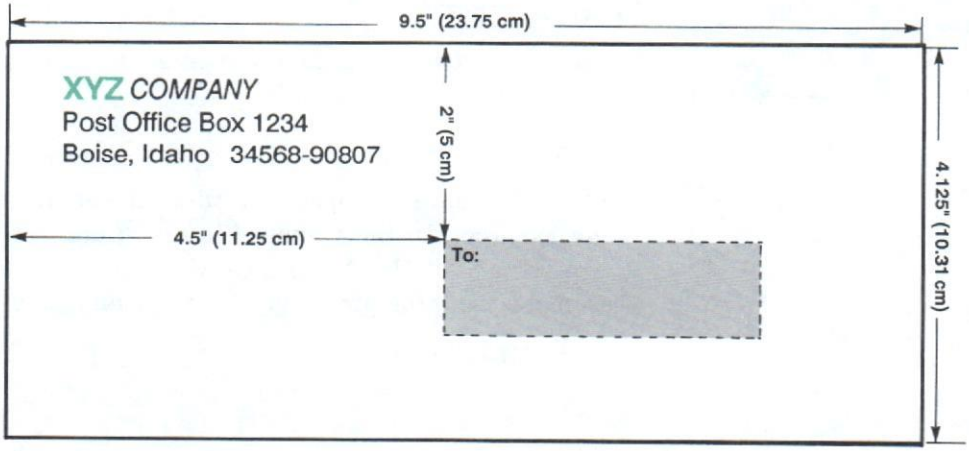


Figure 5-6. Setting Margins for a COM-10 Envelope

3. Open and extend the face-up output tray. (You can use the top output tray; however, using the face-up output tray reduces paper jams, excessive paper curling, and smudged print.)
4. Send the data to the printer.
5. The printer goes off-line and displays `PE FEED COM 10`.
6. Adjust the guides to the size of the envelope (see Figure 5-4).
7. Flatten the leading edge of the envelope before fe ding to reduce jamming problems.
8. Slide a COM-10 envelope between the manual feed guides until it stops. The proper orientation is
 - The side you want printed facing upward.
 - The top edge of the envelope should be flush against the left manual feed guide.

Figure 5-7 illustrates the proper way to insert an envelope.

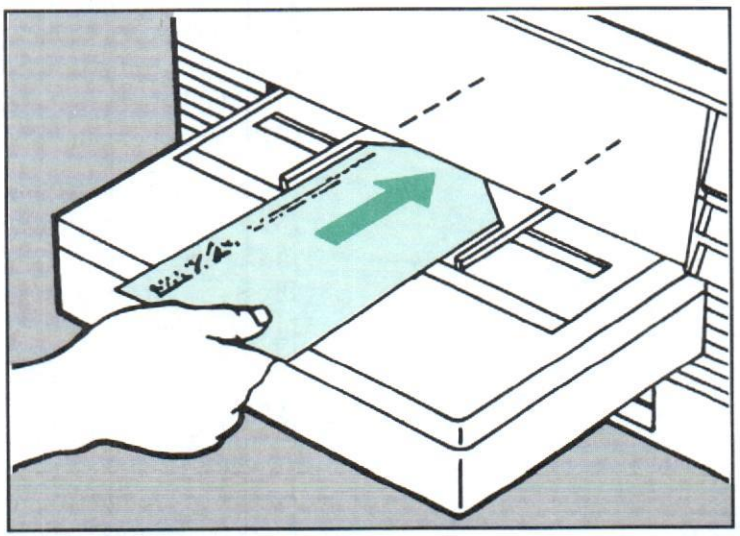


Figure 5-7. Manually Feeding an Envelope

To feed additional envelopes, wait for the `PE FEED COM 10` message to appear in the display again.

Note

If the printing on the envelope is too dark or smudged, you may need to adjust the print density. Open the top of the printer and adjust the print density dial to a lower number to reduce gray background, then close the top of the printer. (You may want to experiment; usually a setting of 2 or 3 works best for envelopes. See Chapter 6.)

If you print envelopes frequently, consider purchasing the optional envelope tray (HP part no. 92297F). This tray holds up to 15 envelopes. Refer to the *Supplies and Accessories* brochure for ordering information, or contact HP's Direct Marketing Division (see page *vii*).

Example - Manually Feeding A COM-10 Envelope Using the Control Panel

In step 1 of the preceding example, you created a software command for manually feeding a COM-10 envelope. If your software doesn't allow you to create or issue such a command, you can still use the control panel to complete the task. Follow these instructions to manually feed a COM-10 envelope using the control panel:

1. Take the printer off-line.
2. Press (Menu) repeatedly until `PAPER=LETTER*` appears in the display.
3. Press (+) four times until `ENVELOPE=COM 10` appears in the display.
4. Press (Enter) to set the envelope selection. (An * appears in the display.)
5. Press (Menu) again. `ORIENTATION=P*` appears in the display.
6. Press (+) to display `ORIENTATION=L`.
7. Press (Enter) to set the selection. (An * appears in the display.)
8. Press (Menu) twice. `MANUAL FEED=OFF*` appears in the display.
9. Press (+) to display `MANUAL FEED=ON`.

10. Press [Enter] to set the manual feed selection. (An * appears in the display and the Manual Feed indicator lights.)
11. Press [On Line] to exit the Printing Menu and return to on-line.

Now continue from step 2 of the previous example to send your envelope data to the printer. Be sure to reset the menu items when you are done printing envelopes.

Manually Feeding Labels

The procedure for printing labels is similar to printing envelopes or legal paper using manual feed.

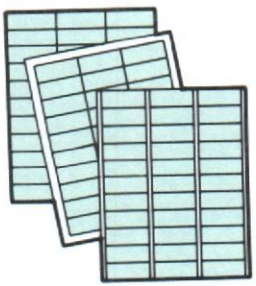
Note

For best results, *manually* feed sheets of labels, rather than automatically feeding them from the paper tray.

1. Format label data using your software.
2. Select manual feed.
3. Open the face-up output tray.
4. Adjust the manual feed guides on the paper tray.
5. Send data to the printer from your computer.
6. When prompted, insert the label stock face up (that is, with the labels on top).

Caution

Not all commercial printing labels are suited for this printer. Labels not meeting the proper specifications can peel off the sheet while in the printer, causing paper jams and potentially damaging the printer. Refer to the Appendix D for information on selecting label stock.



For information on formatting and printing labels with some of the popular software packages, refer to the *Software Application Notes.*

Manually Feeding Overhead Transparencies



The procedure for printing overhead transparencies is also similar to printing other media using manual feed.

1. Format data for the transparency using your software.
2. Select manual feed from the control panel.
3. Open the face-up output tray.
4. Adjust the manual feed guides on the paper tray.
5. Send data to the printer from your computer.
6. Insert the transparency when prompted.
7. Remove each transparency immediately after printing. Do not allow them to stack up in the paper tray, because they may stick together.

Caution



Not all commercial transparencies are suited for this printer. Transparencies not meeting the proper specifications can cause paper jams and may damage the printer. Refer to the Appendix D for information on selecting transparency stock, and to the most recent *Supplies and Accessories* brochure for ordering information.

Troubleshooting Manual Feed



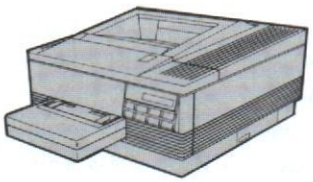
If you are having trouble with manual feed, check the following:

- Is the printer control panel set up correctly?
- Have you entered your printer commands correctly?
- Is your software overriding the manual feed selection made from the control panel?
- Are you inserting the paper, transparency, or envelope far enough into the machine?
- If the envelope has a gray background, did you remember to set the print density to a lower number setting (darker density)?
- If you are experiencing jams or paper curl, are you using the face-up output tray?

Make sure the paper input tray is not overstuffed; if so, you may need to reduce the amount of paper. However, leave at least two sheets of paper in the paper tray for the best results.

6

Cleaning and Maintaining Your Printer

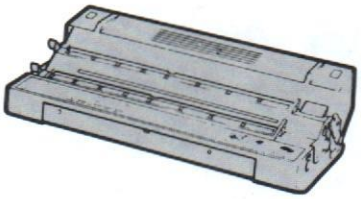


The LaserJet III printer requires minimum routine operator maintenance.

When you want to make an adjustment or improvement in the print quality, use this chapter to find information on:

- Extending the life of the EP-S cartridge.
- Adjusting the print density.
- Changing the ozone filter.
- Cleaning the:
 - transfer corona wire.
 - transfer guide.
 - transfer guide lock tray.
 - paper feed guide.
 - primary corona wire.
 - fuser separation pawls.
 - anti-static teeth.

Extending Your EP-S Cartridge's Life



The EP-S cartridge in your LaserJet III printer contains an electrophotographic print drum and a supply of toner.

When you use the LaserJet III printer to print typical word-processed text, an EP-S cartridge lasts approximately 4000 pages. A typical page has 4-5% actual toner coverage; depending on the density of toner for your pages, your EP-S cartridge life may be longer or shorter.

You can extend the life of an EP-S cartridge by running your printer with the print density adjustment dial set on a higher number (for lighter print). You may want to consider this for printing routine pages where you can tolerate lighter print. See "Adjusting Print Density" on page 6-4 for help.

Do not remove the toner cartridge from its packaging until you are ready to use it. The shelf life of an unopened cartridge package is approximately $2\frac{1}{2}$ years of storage plus usage; the maximum shelf life of an opened cartridge package is approximately six months plus usage.

Caution

We recommend you do NOT attempt to refill or use a refilled cartridge. HP has no control over the refilling process or the materials used, and poor print quality may result. Damage not covered by your printer's warranty may also result, and HP is not liable for such damage.

EP-S Cartridge Storage

Always store cartridges:

- as specified on the shipping box, or horizontally (flat) if removed from the box.
- in a normal office environment (regulated temperature and humidity).
- away from direct sunlight.

When TONER LOW is Displayed

If the 16 TONER LOW message appears in the display, the toner level in the EP-S cartridge is getting low. The print on the pages gets lighter and white streaks may soon begin to appear. To redistribute the toner:

1. Open the printer's top cover.
2. Remove the EP-S cartridge.
3. Rotate (rock) the EP-S cartridge from side to side to distribute toner. (See Figure 6-1)
4. Re-insert EP-S cartridge.

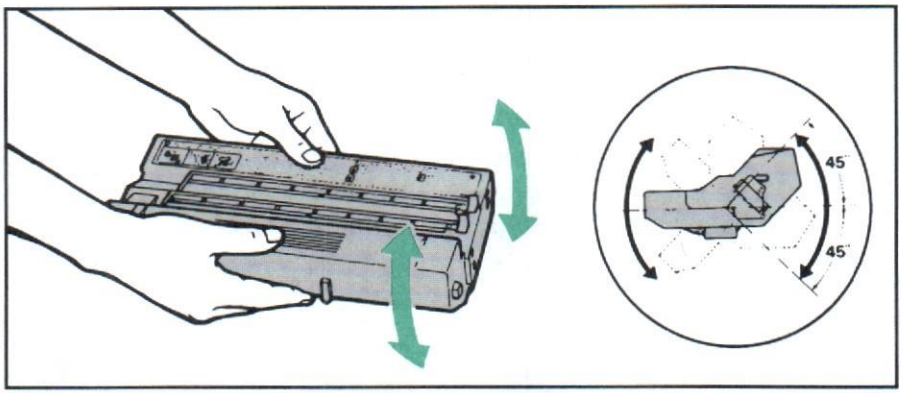
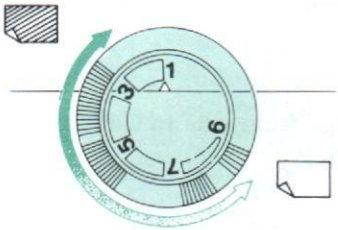


Figure 6-1. Rotating the EP-S Cartridge

The 16 TONER LOW warning may still appear, but the print quality should improve for a while. If the print remains light, you need to replace the EP-S cartridge immediately. Install the new cartridge as described in *Your Guide to Setting Up Your LaserJet III Printer.* (These instructions are also included with the cartridge.)

Adjusting Print Density



Print density refers to the relative darkness of the print on the paper. Very dense print appears very black with a slightly "heavy" look. Less dense print looks lighter, and solid filled areas may be less uniformly black.

When you print with the density set at a low number, you use the toner at a faster rate than with lighter (higher number) print density settings. Using more toner reduces the life of the EP-S cartridge. Printing with a light density setting helps conserve toner when dark (heavy) print is unnecessary. To adjust print density:

1. Open the printer's top cover.
2. Turn the numbered dial located inside the printer at the left end (see Figure 6-2). "1" is the darkest setting and uses more toner. "9" is the lightest setting and uses the least toner. Start with a setting of "5".
3. Firmly close the printer's top cover.
4. Print approximately 20 pages, to allow the new density setting to stabilize.

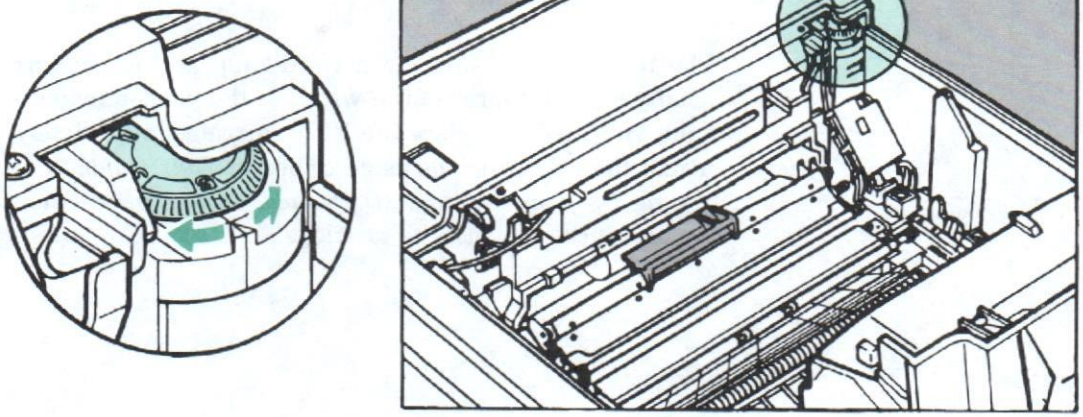
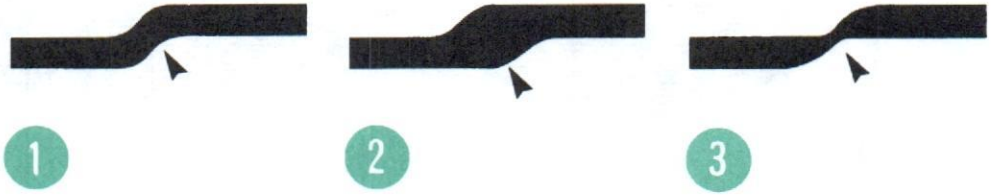


Figure 6-2. Adjusting Print Density (view from rear)

Print Density and Resolution Enhancement

The print density adjustment setting interacts with *Resolution Enhancement* (see Chapter 2). For any resolution enhancement level, adjusting the print density may place too much or too little toner at the transition points along gradually sloping lines. You may notice a slight bulbing or pinching effect if you examine the lines closely. The following drawings illustrate how the line transitions appear with different amounts of toner:



1. Normal line transition
2. Too much toner; set RET in the control panel Configuration Menu to a lighter setting.
3. Too little toner; set RET in the control panel Configuration Menu to a darker setting.

Check your adjustment by examining a self test printout. Look at the 33% slice in the pie chart. If you see light vertical stripes (Figure 6-3, left side), try setting RET to the next darker setting. If you see dark vertical stripes, try setting RET to the next lighter setting. If your output still has dark vertical stripes (Figure 6-3, right side), adjust the print density dial to a slightly lighter setting (a bigger number on the print density dial) and repeat the adjustment.

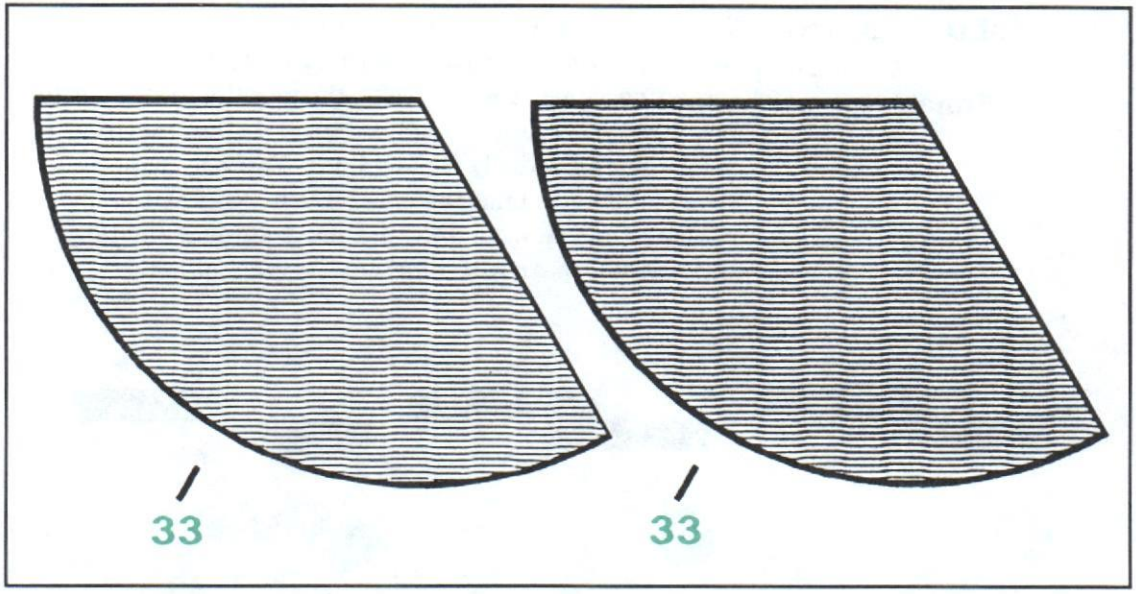
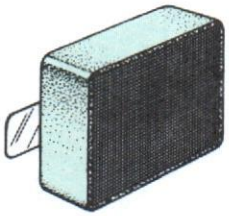


Figure 6-3. Vertical Stripes in the 33% Pie Slice

Replacing the Ozone Filter



Ozone (O_3) is a colorless gas generated by all laser printers and photocopiers. Appendix C provides guidelines concerning ozone emissions in the workplace. Your LaserJet III printer has an ozone filter that you should replace every 50,000 pages. (Although the filter may appear clean, it loses its ability to filter ozone after approximately 50,000 pages.) You can print a self test (as described on page 4-12) to see the current page count. You may need to replace the filter more often if you are operating your printer in the conditions described on pages C-5 and C-6.

Warning

Failure to replace the ozone filter as required will result in ozone emissions above the recommended levels.

To replace the filter:

1. Open the printer's top cover.
2. Locate the ozone filter, in the housing on the inner-right side of the printer (see Figure 6-4).

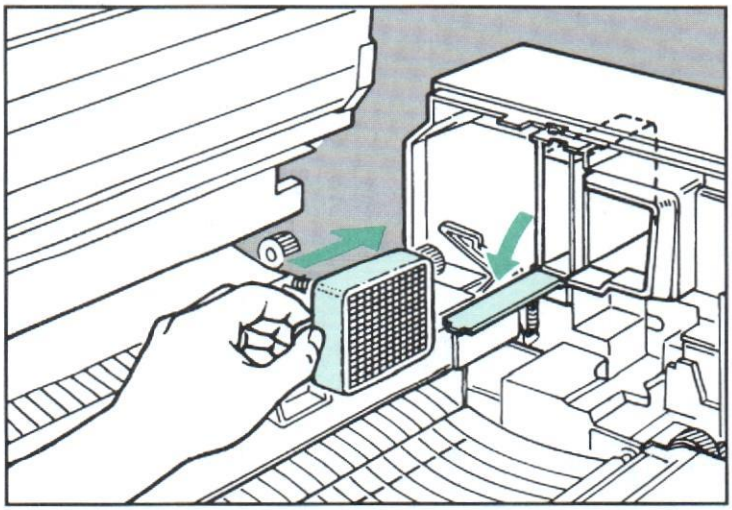
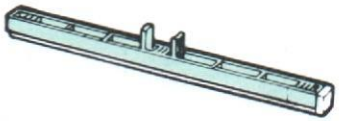


Figure 6-4. Replacing the Ozone Filter

3. Flip the filter cover down.
4. Slide the filter out by pulling the clear plastic tab.
5. Replace with a new filter, HP part number RF1-2130-000CN. The plastic tab should face out.
6. Close the filter cover.
7. Close the printer's top cover.

Replacing the Cleaning Pad



The cleaning pad (Figure 6-5) cleans the rollers in the fusing assembly, where toner is fused onto the paper. New cleaning pads are included with EP-S toner cartridges, or you can purchase them separately. (Contact the Support Materials Organization. In the U.S., the toll-free number is 800-227-8164. Ask for part number RG1-0966-030.) You usually need to replace the cleaning pad only when replacing the EP-S cartridge. Instructions for replacing the cleaning pad are included with the EP-S cartridge and with *Your Guide to Setting Up Your LaserJet III Printer.* If you are getting blurred vertical lines in your printouts and need to replace the cleaning pad before then, follow these instructions:

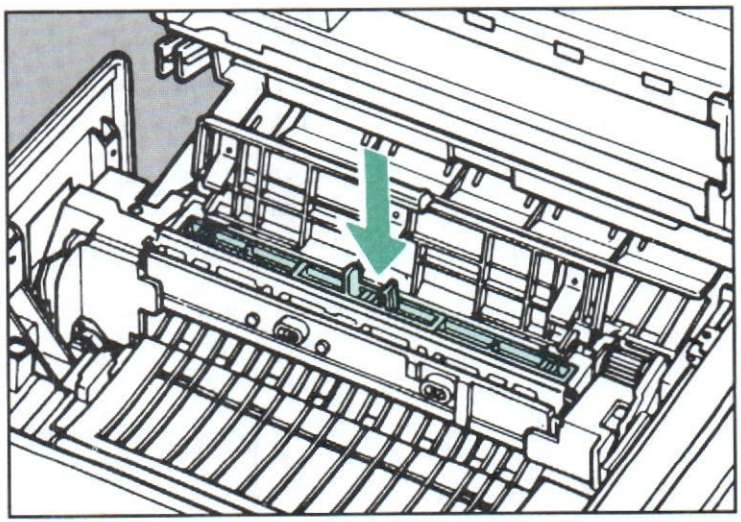


Figure 6-5. Replacing the Cleaning Pad

Warning



The fusing assembly is HOT when the printer is turned on. The only part of the fusing assembly you should handle while replacing the cleaning pad is the green felt cover. Touching other parts of the fusing assembly may result in burns or other injury.

1. Turn the printer OFF.
2. Open the printer's top cover.
3. Lift open the fusing assembly lid. (The lid is covered with green felt and has the words WARNING - HIGH TEMPERATURE printed on its top surface.)
4. Remove the old cleaning pad.
5. Use the small felt square at one end of the new cleaning pad to wipe the fusing assembly roller.
6. Discard the felt end of the cleaning pad. Then insert the new cleaning pad.
7. Lower the fusing assembly cover–it does not close tightly.
8. Close the printer's top cover.
9. Turn printer back ON.

Cleaning the Printer

Any time you observe reduced print quality:

1. Turn the printer OFF.

Warning



Failure to turn the printer off before you clean the interior may result in personal injury or in damage to the printer.

2. Open the printer's top cover.
3. Clean the inside of the printer by wiping any visible toner away, using a cloth dampened with water.

Clean the remaining areas as described in the following sections. Figure 6-6 shows the areas of the printer which require cleaning.

Caution



Any solvents used in and around the printer except high-quality isopropyl alcohol or water may cause damage to the printer. Ammonia based cleaning materials should not be used on the printer covers or in the vicinity of the printer, as ammonia will cause permanent damage to the EP-S cartridge.

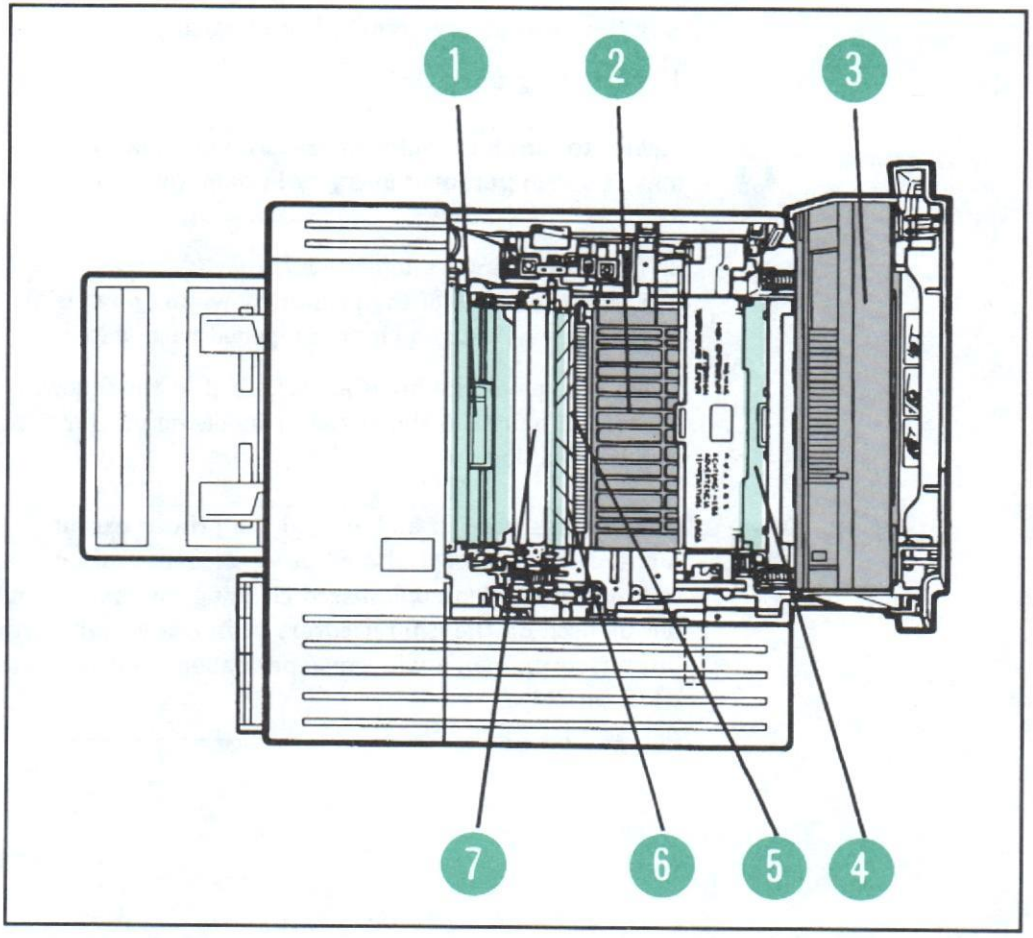


Figure 6-6. Printer Cleaning Locations (open view from top)

1. Transfer guide lock tray area (with handle)
2. Paper feed guide
3. Primary corona (in EP-S cartridge)
4. Fuser separation pawls (inside rear section of the fusing assembly)
5. Anti-static teeth
6. Transfer guide
7. Transfer corona wire

Cleaning the Transfer Corona Wire

Follow these instructions to clean the transfer corona wire and the area surrounding it:

Caution



Be careful not to break the mono-filament lines that cross above the transfer corona wire. Also be careful not to break the corona wire itself.

1. Turn the printer OFF.
2. Open the printer's top cover.
3. Use a cotton swab dipped in isopropyl alcohol or water. Make sure the swab is not dripping. Keep the alcohol away from any rollers or plastic parts. Clean the following areas:
 - The orange pads at the end of the wire area.
 - Along the area underneath the plastic lip.
 - Along the back of the casing.
4. Clean the entire transfer corona wire top, bottom and sides (along the length) with the clean cotton swab until no residue remains. (Refer to Figure 6-7.)

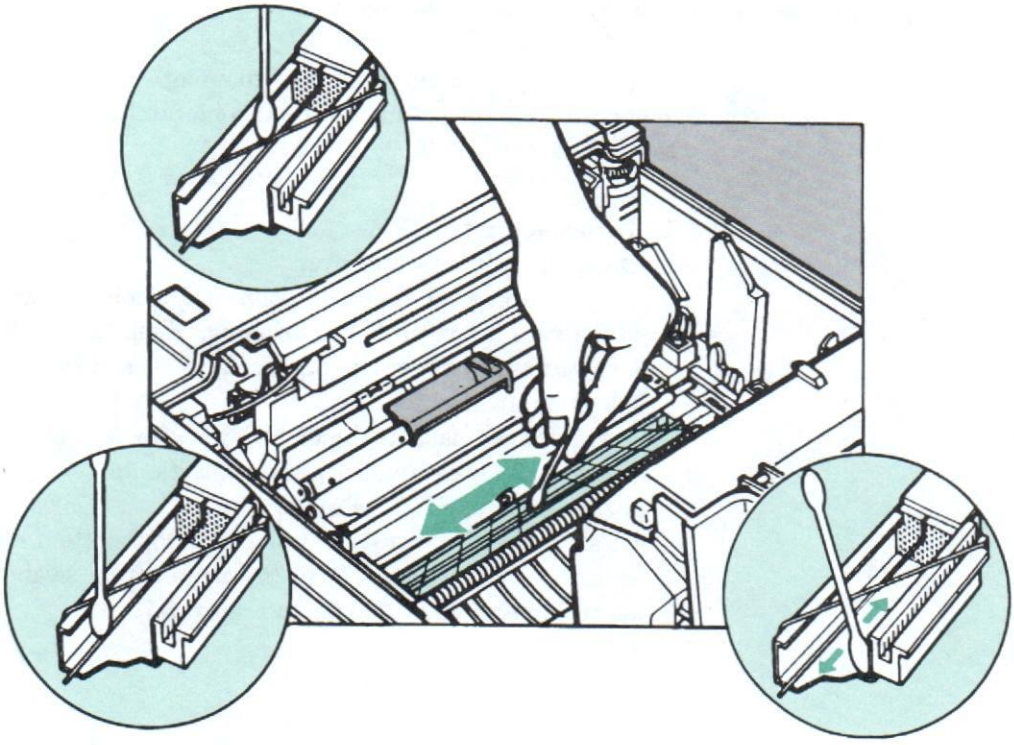


Figure 6-7. Cleaning the Transfer Corona Wire Area

Cleaning the Transfer Guide Area

1. Turn the printer OFF.
2. Open the printer's top cover.
3. With a damp cloth (*use water only*), wipe off residue from the silver metal strip (see Figure 6-8 below).
4. Wipe off any paper dust on the adjoining transfer guide roller and the top of the transfer guide lock tray.
5. Open the transfer guide lock tray by lifting up the green handle.
6. Wipe along the inner silver and brass colored metal strips.
7. Close the transfer guide lock tray.

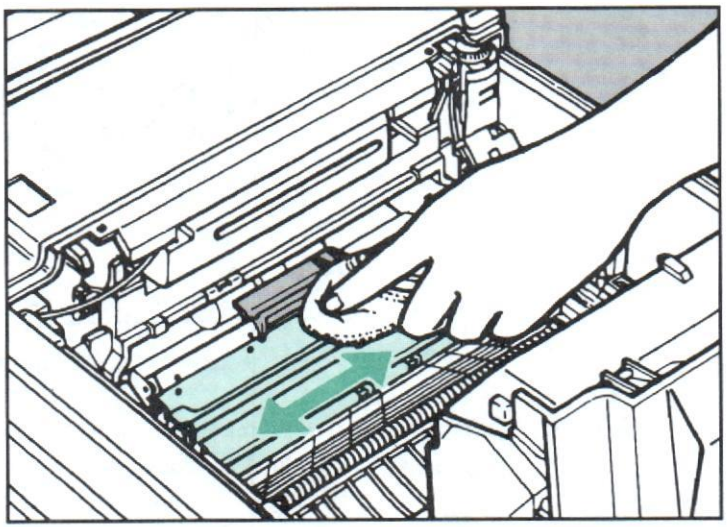


Figure 6-8. Cleaning the Transfer Guide Area

Cleaning the Paper Feed Guide

Wipe off any dust or dirt on the Paper Feed Guide with a damp cloth (*use water only*).

Warning

The adjacent fusing area gets HOT. Also, be careful not to get toner on your clothing; it may stain.

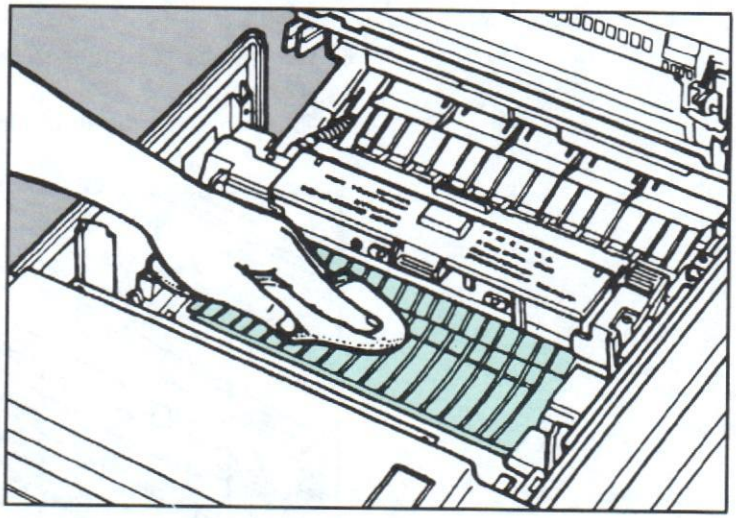


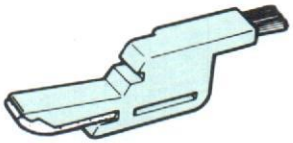
Figure 6-9. Cleaning the Paper Feed Guide

Cleaning the Primary Corona

The primary corona is inside the EP-S cartridge. You do not need to clean it as often as the transfer corona wire. Because the EP-S cartridge is delicate, it should only be cleaned when print quality begins to degrade.

Caution

Clean the primary corona wire carefully, using the cleaning brush provided. If the wire breaks, the EP-S cartridge will have to be replaced.



1. Turn the printer OFF.
2. Open the printer's top cover.
3. Remove the EP-S cartridge from the printer.
4. Lift out the cleaning brush, as shown in Figure 6-10.
5. Carefully insert the felt tipped end of the brush in one end of the EP-S cartridge slot, as shown in Figure 6-11. (The brush will fit only one way. Look carefully at Figure 6-11 for the correct way to position the cleaning brush.)
6. Slide the brush back and forth a few times to clean the primary corona wire.
7. Return the brush and the EP-S cartridge to the printer.

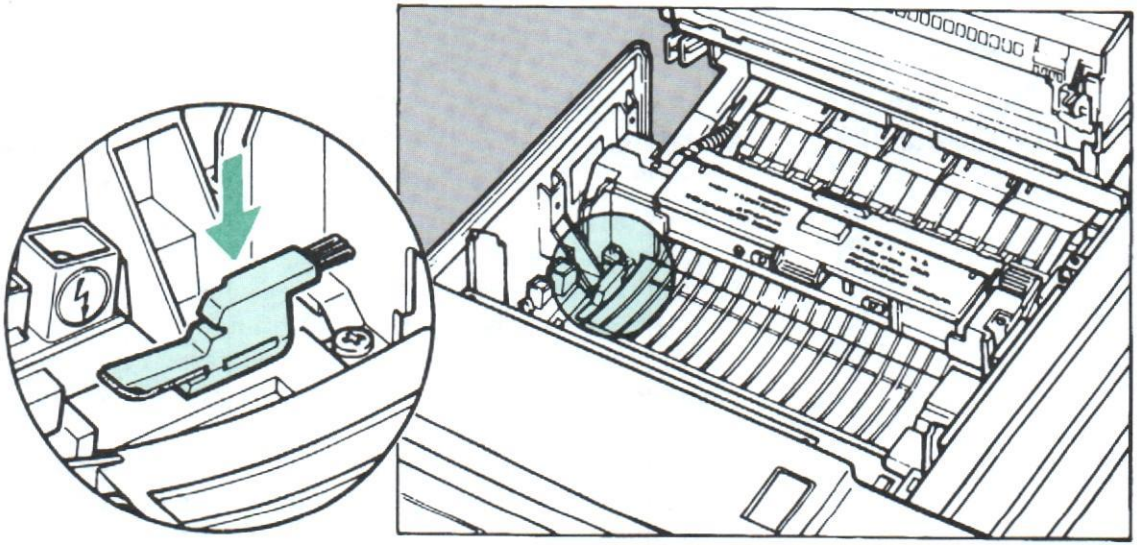


Figure 6-10. Cleaning Brush Location

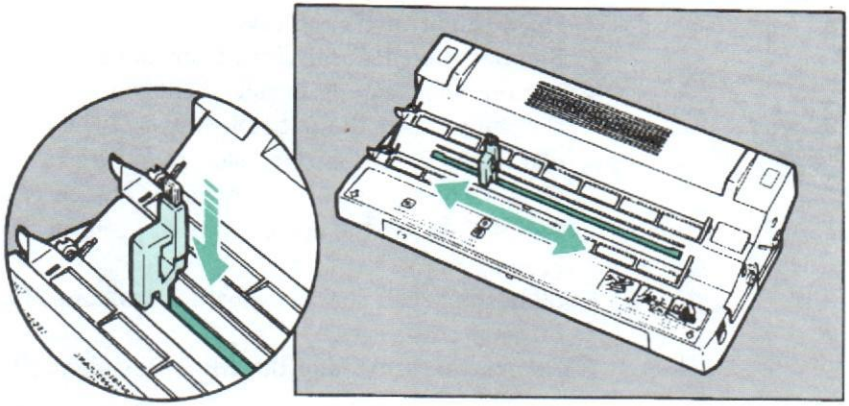


Figure 6-11. Cleaning the Primary Corona Wire on the EP-S Cartridge

Cleaning the Fuser Separation Pawls

Periodically cleaning the fuser separation pawls (claws) will help prolong the life of your printer's fusing assembly. To clean the pawls:

1. Turn the printer OFF.
2. Fully open the top cover.
3. Push the rear section of the fusing assembly (Figure 6-6) fully open, toward the back of the printer. You will be able to see the four black, plastic fuser separation pawls (claws) along lower edge of the section you just pushed back.
4. Clean the tip of each pawl with a cloth dampened with water. Avoid contact with the main portion of the fusing assembly.

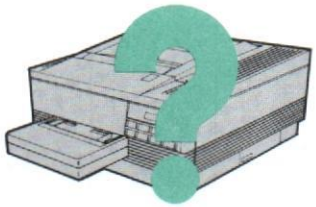
Cleaning the Anti-Static Teeth

The anti-static teeth are located just beyond the transfer corona wire, between two black plastic strips on the transfer corona housing (Figure 6-6). Periodically cleaning the anti-static teeth helps prevent paper jams. Use the cleaning brush provided with your printer to brush out any accumulations of paper dust and toner from around the anti-static teeth.

7

Troubleshooting

Where to Look for Help



Printer difficulties have many causes ranging from simple problems, like running out of paper, to more difficult ones, like incorrect computer-to-printer configuration.

- If your printer has a paper jam, or other paper-related problems, go directly to page 7-10.
- If you experience difficulty with the printer, but no messages appear in the display, start with "Improving the Print Quality", beginning on page 7-16 or the "Troubleshooting Checklist" beginning on page 7-20.
- If a message appears in the display, refer to the following sections for the meaning of each message and the actions to take.

Printer Messages

Messages appearing on the control panel display belong to one of these categories:

- **Status messages** keep you aware of the printer's current operating condition (page 7-3).
- **Attendance messages** request you to perform a necessary task before printing continues (page 7-4).
- **Error and service messages** indicate that the printer has encountered difficulty (page 7-7).

Note

The first two characters of attendance and error messages *blink* to alert you to the need for attention.

Calling for Help



If you try all the suggestions given in this manual, and you still need assistance, call the authorized Hewlett-Packard dealer where you purchased your printer. Another source of help is Hewlett-Packard's Personal Peripherals Assist Line. A customer assistance technician will help you solve your problem. For the telephone number and more information on assistance, see "Help From The Personal Peripherals Assist Line" in Chapter 8 of this manual.

Printer Status Messages

The following table lists the printer status messages and their meanings:

Table 7-1. Printer Status Messages

Message Displayed	Meaning
00 READY	Proceed. The printer is ready to use.
02 WARMING UP	Wait until the printer signals ready.
04 SELF TEST	Printing continuous self test. (Press [On Line] or [Continue] to stop the test.)
05 SELF TEST	Self test in process.
06 PRINTING TEST	Printing a self test.
06 FONT PRINTOUT	Printing a font list.
07 RESET	The printer returns all Printing Menu items to user-selected settings and clears buffer pages, temporary soft fonts and temporary macros.
08 COLD RESET	The printer returns all Printing Menu and Configuration Menu settings to the factory default configuration.
09 MENU RESET	The printer returns all Printing Menu items to factory settings and clears buffer pages, temporary soft fonts and temporary macros.
15 ENGINE TEST	Engine test with printout.
17 MEMORY CONFIG	The printer is reconfiguring its memory for page protection.

Printer Attendance Messages

The following table lists the attendance messages, along with the recommended action.

Table 7-2. Printer Attendance Messages

Message	Description	Recommended Action
10 RESET TO SAVE	Changes to Printing Menu have been made while data, temporary fonts or macros are still present in printer memory.	Reset the printer to confirm the acceptance of your selections. Temporary macros, temporary fonts, and buffered data are deleted. If you press (Continue) or (On Line) instead, your changes are still recorded in the menu (marked with an *), but won't become active until the next time the printer is reset.
12 PRINTER OPEN	The upper main body of printer is not closed properly.	Close the cover firmly, ensuring it is latched properly.
13 PAPER JAM	Paper is jammed in paper path; the paper jam sensor at the rear of fuser assembly may be stuck, causing a false paper jam warning.	Open the cover and remove jammed paper. The cover must be opened and re-closed before pressing (Continue) or (On Line) to resume (see "Clearing Paper Jams," in this chapter).
14 NO EP CART	The EP-S cartridge is not installed correctly.	Insert an EP-S cartridge or make sure the cartridge is fully seated.
16 TONER LOW	The EP-S cartridge is almost out of toner.	See "When TONER LOW is Displayed" in Chapter 6.

Table 7-2. Printer Attendance Messages (continued)

Message	Description	Recommended Action
FE CARTRIDGE	A font cartridge was removed or replaced while the printer was on-line. (This message appears even if the fonts in the cartridge weren't being used.)	Power the printer OFF, then ON again. (Ensure the printer is *off-line* when you re-insert the cartridge.)
FC *left, right, both*	A font cartridge was removed or replaced while the printer was off-line and contained buffered data.	Re-insert the cartridge(s) and press (Continue) or (On Line).
FC *left, right, both* **NO FONT**	A cartridge font could not be read by the printer.	Re-insert the cartridge indicated and press (Continue) or (On Line) to return on-line. If the problem persists, the cartridge is bad and must be replaced.
PF FEED *paper size*	The printer received a command to manually feed a sheet of paper, *paper size* may be: A4, EXEC, LETTER, or LEGAL.	Feed the paper through the manual feed slot, or press (Continue) to feed from the tray*.
PE FEED *envelope size*	The printer received a command to manually feed an envelope, *envelope size* may be: COM-10, MONARCH, DL, C5, or ENVELOPE.	Feed envelope through the manual feed slot, or press (Continue) to feed from the tray*.
PC LOAD *paper size*	The printer received a request for paper tray size not currently loaded (or tray is empty). *paper size* may be: A4, EXEC, LETTER, or LEGAL.	Load the correct paper tray and the printer will continue, or press (Continue) to use the installed tray*.

Table 7-2. Printer Attendance Messages (continued)

Message	Description	Recommended Action
EC LOAD *envelope size*	The printer received a request for an envelope tray size that is not currently loaded (or tray is empty). *envelope size* may be: COM-10, MONARCH, DL, or C5.	Load the correct envelope tray and the printer will continue, or press (Continue) to use the installed tray.*
PE TRAY=*envelope size*	This is displayed whenever the envelope tray is inserted into the printer. *envelope size* may be: COM-10, MONARCH, DL, or C5.	Change *envelope size* through the control panel if not correct. The new *envelope size* is stored in NVRAM and becomes the new default shown whenever the envelope tray is inserted. If *envelope size* is correct, no action is necessary. The display returns to 00 READY after 10 seconds.

*If the paper in the tray is not the same size as requested by the message, the printed image may be clipped.

Printer Error and Service Messages

The following table lists the error and service messages, along with the recommended action.

Table 7-3. Printer Error and Service Messages

Message Displayed	Meaning
20 MEM OVERFLOW	The printer received more data from the computer than can fit in its internal memory. You may have tried to transfer too many macros or soft fonts, or too much graphics. Press (Continue) to resume printing. You may need to purchase additional memory.
21 PRINT OVERRUN	Data (rules, raster or vector graphics, dense text) sent to the printer was too complex. Press (Continue) to resume printing. You may lose some data, or your page image may be printed in parts. Reduce your page complexity to eliminate the problem, or use the *page protection* feature described in Chapter 4.
22 I/O CNFIG ERROR	The computer and printer are not communicating because of improper signal protocols. Press (Continue) to clear the error message. Refer to the configuration notes in *Your Guide to Setting Up Your LaserJet III Printer* to verify the printer configuration. The LaserJet III printer uses XON/XOFF and DTR signal protocols, and does not use Enquire/Acknowledge. If the error continues call your HP Service Representative.
40 ERROR	The printer encountered an error while transferring data from the computer because you turned your computer ON or OFF while the printer was on-line, or your printer's baud rate or parity was not the same as the computer's. Press (Continue) to clear the error message. Make sure the printer is set at the same baud rate as the computer.
41 ERROR	A temporary error has occurred on the printed page. Remove the paper from the output paper tray and press (Continue). The page containing the error will be automatically reprinted.

Table 7-3. Printer Error and Service Messages (continued)

Message Displayed	Meaning
42 or 43 OPT INTERFACE	A problem has occurred on the card installed in the optional interface slot. Press (Continue) to clear the error message. Make sure your optional interface is installed and configured correctly. If the problem continues, call the dealer from whom you purchased the interface.
41,51,52,54 or 55 ERROR	If any one of these errors appears, press (Continue) to resume operation. Some data loss may occur.
53-1 ERRORUNIT	An error was detected on the optional memory card in the *forward* slot. Verify that the correct revision level of memory is installed in the printer. For best results, use HP memory.
53-2 ERRORUNIT	An error was detected on the optional memory card in the *rear* slot. Verify that the correct revision level of memory is installed in the printer. For best results, use HP memory.
57-1 ERRORUNIT	The memory card in the *forward* slot cannot be configured because it exceeds memory capacity.
57-2 ERRORUNIT	The memory card in the *rear* slot cannot be configured because it exceeds memory capacity.
63 SERVICE	The printer identified a problem while checking its internal memory. Turn the printer OFF and then back ON (you will lose any data stored in the printer). If the error continues, call your HP Service Representative. If the printer contains an expandable memory board, turn the printer OFF. Verify that the memory board was installed correctly and then turn the printer back ON. If the error continues, turn the printer OFF and remove the expandable memory board. Turn the printer back ON. If the error message does not appear, the problem is on the memory board; if the error appears again, the problem is in the printer memory. Call your HP Service Representative.

Table 7-3. Printer Error and Service Messages (continued)

Message Displayed	Meaning
50,61,62,64,65, or 67 SERVICE	The printer identified an internal service error. If any one of these errors appear, turn the printer OFF and then back ON. If the error continues, call your HP Service Representative. NOTE: To clear the 50 SERVICE error, the printer must be OFF for at least 10 minutes.
68 ERROR	The printer detected a non-volatile memory error. Press (Continue), then verify your control panel settings.
68 SERVICE	The printer detected a non-volatile memory failure. Service is required. The printer continues to operate if you press (Continue), but `00 READY` will be replaced by `68 READY/SERVICE` until the printer has been serviced.
69 SERVICE	The printer has detected an optional interface error. Power OFF, then ON. If the error persists, service may be required.
70 ERROR	Your personality cartridge is not designed for this printer. Press (Continue) and the printer will use its internal controller.
71 ERROR	Your printer has detected a personality cartridge error. Press (Continue) and the printer will use its internal controller.
72 SERVICE	The font cartridge was removed too quickly after it was inserted. Power the printer OFF, then back ON.
79 SERVICE	An internal controller error occurred. Power the printer OFF, then back ON. If the error appears again, call your HP Service Representative.

Clearing Paper Jams

If the message 13 PAPER JAM appears, follow these steps:

1. Open the cover of the printer.
2. Look for the jammed paper.

Note

Paper jams occur most often when you use paper or other print media that does not meet the specifications listed in Appendix D, when the media is in poor condition, or when the printer needs cleaning. If paper jams occur frequently, clean the printer and check the quality of your paper or other print media.

When paper jams occur, they happen in one of the three places shown in Figure 7-1.

(1) Paper pick-up area
(2) Transfer guide
(3) Fuser assembly and final delivery area

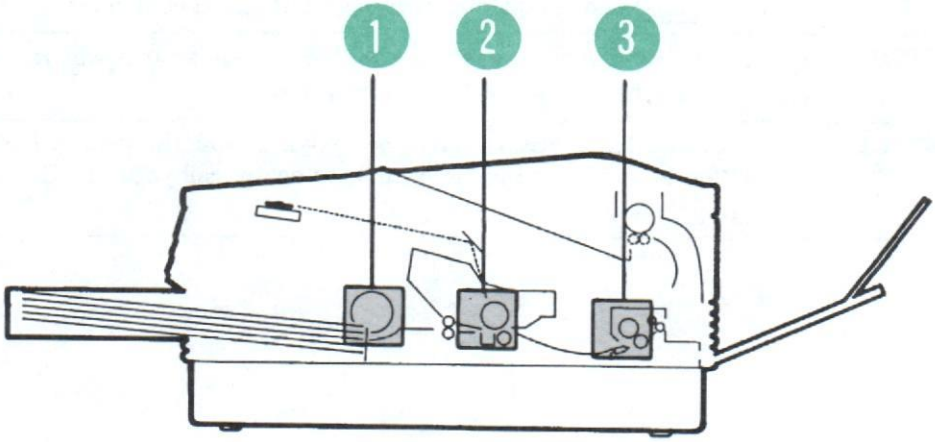


Figure 7-1. Paper Path — Jam Locations

Warning **The fuser assembly area gets HOT. Also, be careful not to get toner on your clothing; it may stain.**

3. If the jam occurs in the fuser assembly area, open the fuser assembly and remove the jammed paper (refer to Figure 7-2).

Caution Pull the paper toward the front of the printer, so it does not go through the fusing assembly. Unfused toner on the paper is loose and may fall into the fuser assembly, causing print quality problems.

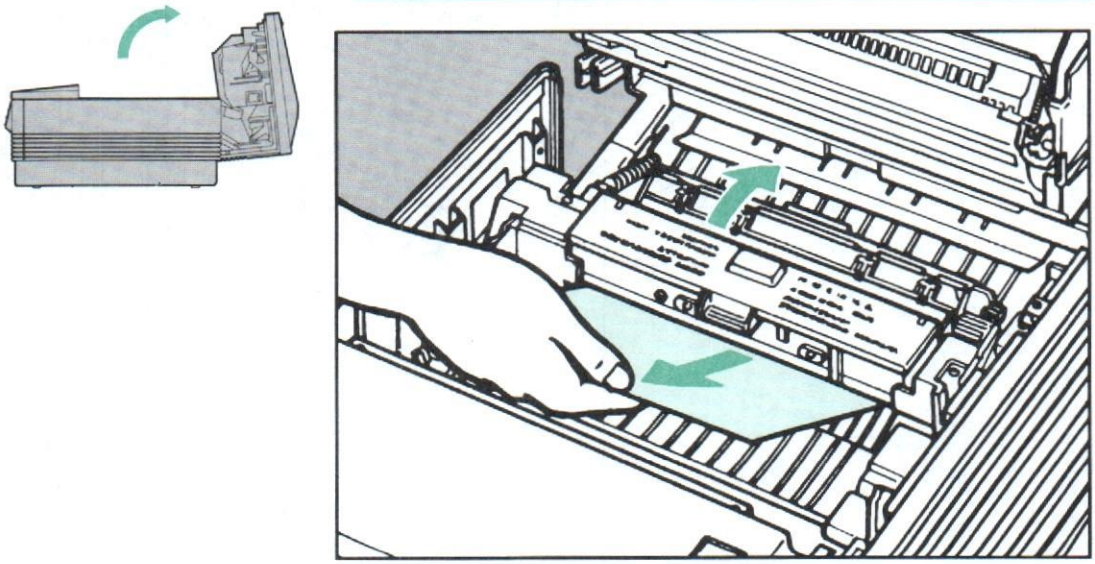
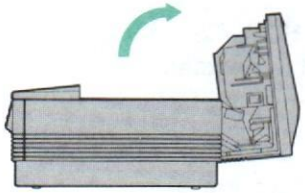


Figure 7-2. Clearing the Fusing Assembly Area



4. If the jam occurs in the transfer guide area, lift the green handle and remove the jammed paper as shown in Figure 7-3.

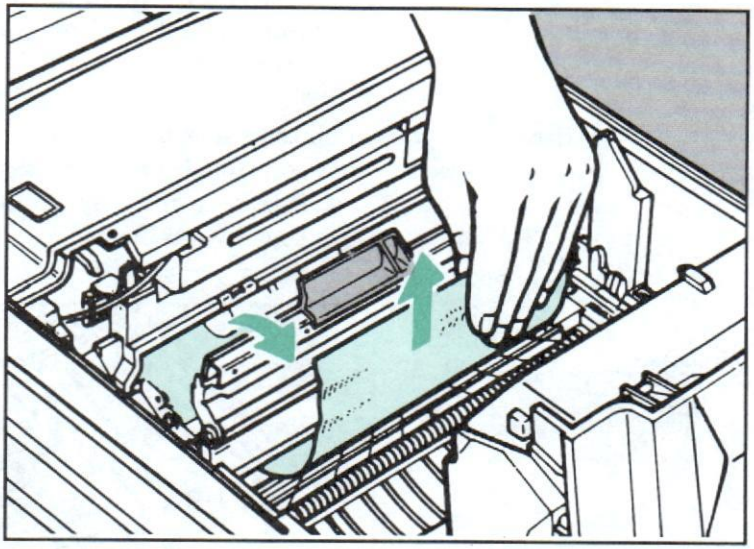


Figure 7-3. Clearing the Transfer Guide Area (rear view)

Caution

Do not force the transfer guide lock tray past the stop (upright) position. Forcing the tray back will damage the printer and result in paper path problems.

5. If the jam occurs in the paper pick-up area, open the transfer guide lock tray by lifting the green handle and remove the paper (Figure 7-4). If necessary, take out the paper tray first.

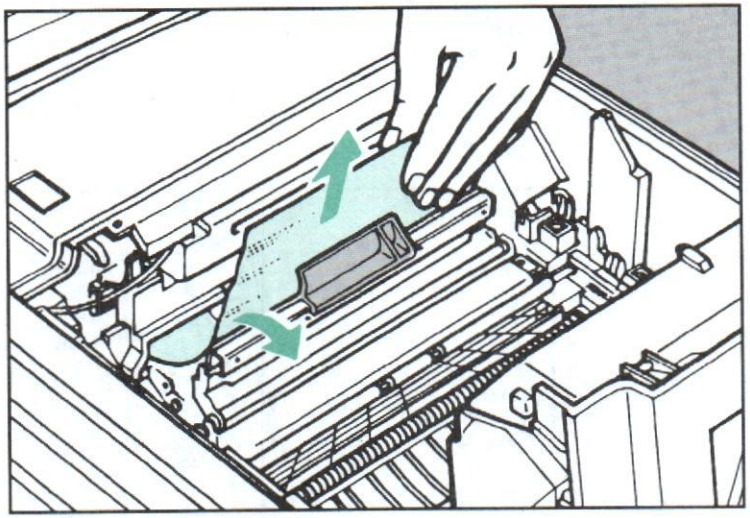
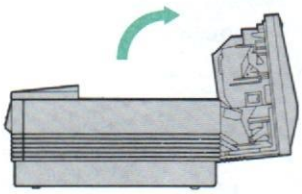


Figure 7-4. Clearing the Paper Pick-up Area (rear view)



6. If you cannot find any paper jammed in the printer, the plastic counterweight for the paper jam sensor may not be in the vertical position, causing a false paper jam message to appear in the display. To correct.this problem, first open the back side of the fuser assembly (refer to Figure 7-5). Locate the plastic counterweight. (From the rear of the printer, look inside the area you have just opened). Then make sure the plastic counterweight is vertical.

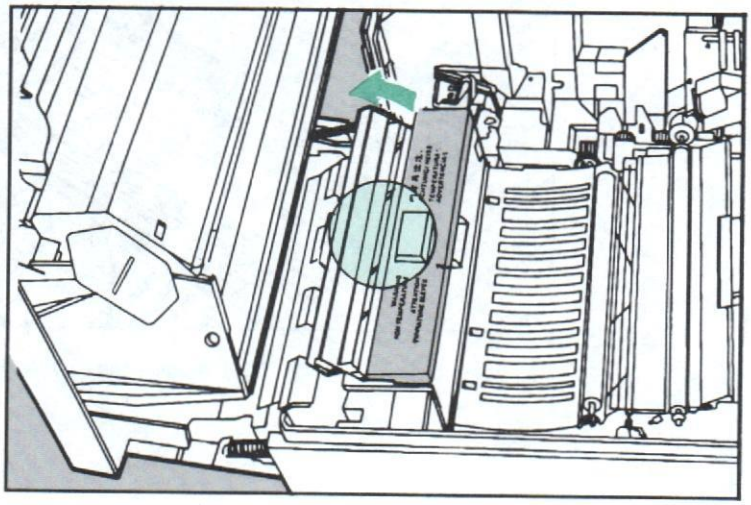


Figure 7-5.
Locating the Plastic Counterweight
for the Paper Jam Sensor.

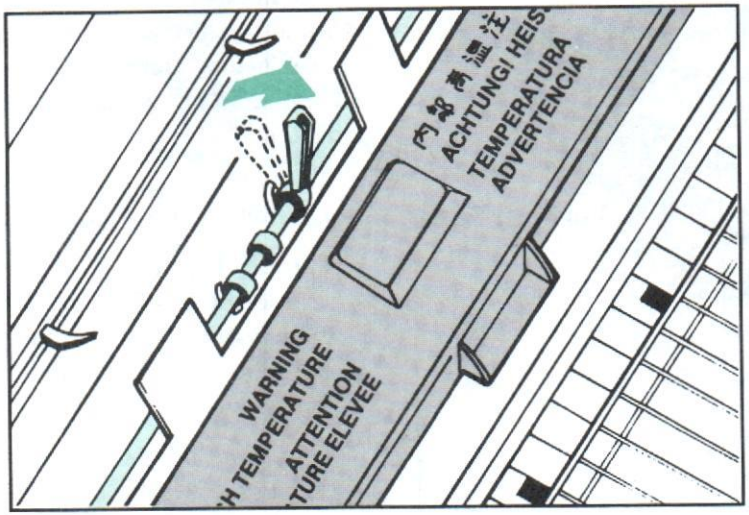


Figure 7-6. Adjusting the Plastic Counterweight.

7. After removing the jammed paper, close the cover of the printer.

Note

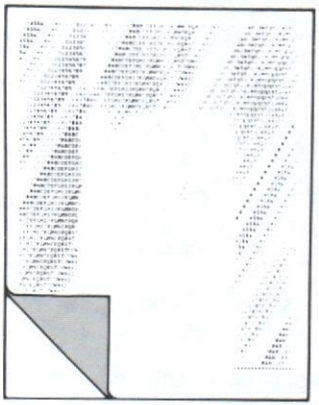
You must open and firmly close the cover of the printer to clear the 13 PAPER JAM message. When closed properly, the edges of the cover are flush with the body of the printer.

8. After you remove the jammed paper and close the printer, the 00 READY message appears. Press [On Line] or [Reset]. The printer automatically reprints the page it was printing when the paper jammed.

Improving the Print Quality

Samples of several of the common print quality problems appear below, along with possible solutions. If the listed solutions do not work, call for help as described in Chapter 8.

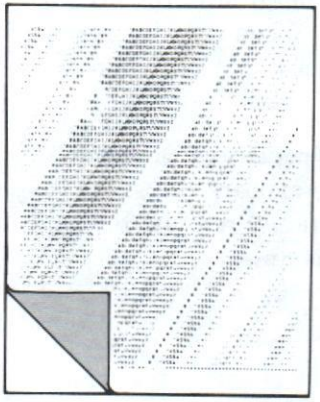
Vertical Fade



If a vertical white streak or faded area appears on the page:

- The EP-S cartridge toner supply is low. Follow the steps for rocking the EP-S cartridge in Chapter 6. If rocking the cartridge does not improve the print quality, replace the EP-S cartridge as described in the pamphlet that comes with the cartridge.
- The print density adjustment is too light. Turn the dial (inside the printer at the left end) to a lower number. The lower the number on the dial, the darker the print.
- The transfer corona wire is dirty. Clean the inside of the printer as described in Chapter 6.

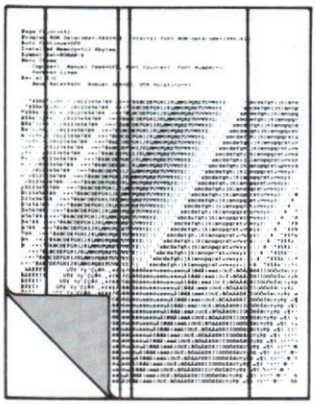
Dropouts



If faded-out areas, generally rounded in shape, occur randomly on the page:

- The moisture content of the paper is uneven, or the paper has moist spots on its surface. Try paper from a different source.
- The paper lot is bad. The manufacturing processes can cause some areas of paper to reject toner. Try paper from a different source.
- The transfer corona wire is dirty. Clean the inside of the printer as described in Chapter 6.

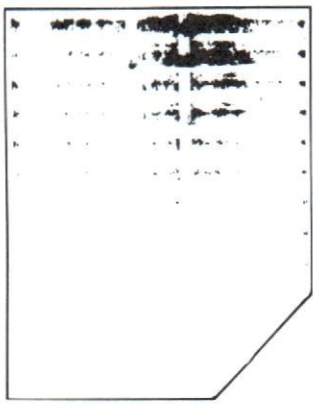
Vertical Lines



If black streaks appear, or if you observe smeared ink aligned vertically on the page:

- The primary corona is dirty. A black stripe at the right side of the page often indicates this problem. Clean the primary corona as described in Chapter 6.
- Smeared vertical lines can signify a dirty or worn fuser roller cleaning pad. Replace the pad (part number RG1-0966-030) as described in the pamphlet that comes with the cartridge. As a temporary measure, you can clean any excess toner off the surface of the pad. Also, clean the inside of the printer as described in Chapter 6.
- The photosensitive drum inside the EP-S cartridge has been scratched, which creates straight thin lines down the page. Replace the EP-S cartridge as described in the pamphlet that comes with the cartridge.

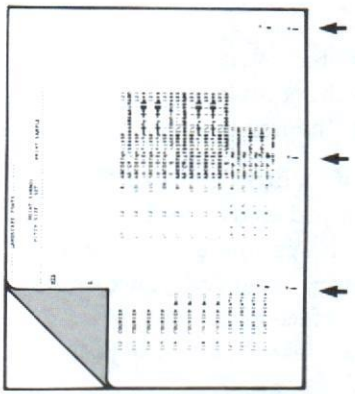
Staining



If dark horizontal stains appear repeatedly down the back of the page:

- The transport rollers are dirty. Clean the inside of the printer as described in Chapter 6.
- The fuser roller cleaning pad is worn. Replace the pad as described in the pamphlet that comes with the cartridge.

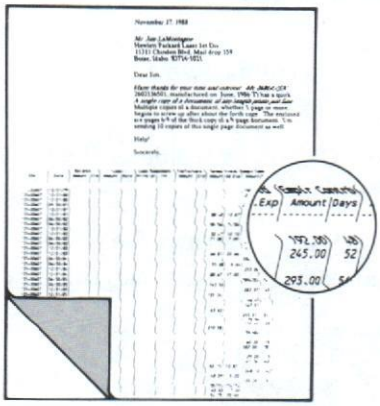
Repetitive Defects



If unwanted marks appear repeatedly on the printed side of the page:

- The transport rollers are dirty. Clean the inside of the printer as described in Chapter 6.
- The EP-S cartridge is damaged. The circumference of the EP-S cartridge drum is $3\frac{3}{4}$ inches (95 mm). If a repetitive mark occurs every $3\frac{3}{4}$ inches on the page, replace the EP-S cartridge.
- The developer roll is defective. If repetitive mark occurs every 2 inches on the page, replace the EP-S cartridge.

Improperly Formed Characters



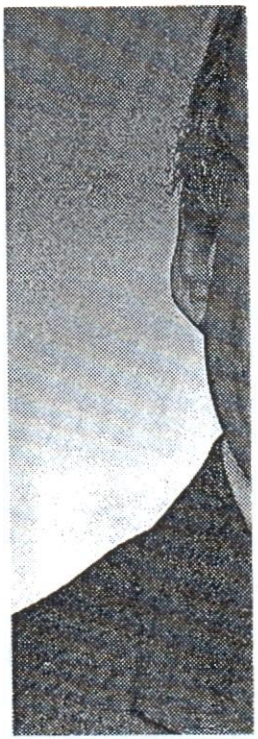
If characters are improperly formed, producing a *wavy* effect:

- Your paper stock may be too slick. Try a different paper.
- The scanner needs service. Call your authorized HP Service Representative.

Poor Halftone or Grayscale Transitions

If images do not have smooth transitions as gray levels gradually change:

- The optional hardware interface board you are using to print gray scale images is not compatible with Resolution Enhancement. Set RET=OFF in the control panel Configuration Menu.





Troubleshooting Checklist



To use this checklist, start at question 1 and step your way through until you find the description of your problem.

1. Does the printer's power come ON?

 YES - go to question 2.

 NO - check the following:

 a. AC power cord is plugged into the receptacle and the printer.
 b. Printer's power switch is in the ON position.
 c. Line voltage is correct for the printer's power configuration:

 (Model 33449A = 115V +/- 10%)
 (Model 33449AB = 220V +/- 10%)
 d. Power receptacle is working correctly.

2. Can the printer produce a self test printout? (Chapter 4, "Running the Printer Self Test")

 YES - go to question 3.

 NO - check the following:

 a. The printer is off-line and the Ready indicator is lit.
 b. The paper tray is installed properly and contains paper.
 c. The printer's top cover is closed.
 d. Paper is not jammed.
 e. The transfer corona wire is clean.
 f. No attendance or error messages appear in the display. (If so, review the status, attendance, and error messages on pages 7-3 through 7-9 for help. If no error messages appear in the display, but the self-test still does not print, you should call for assistance (see Chapter 8).

3. Is the print quality good? (Refer to previous section.)

 YES - go to question 4.

 NO - Try the following:

 a. Rock the EP-S cartridge as described in Chapter 6.
 b. Clean the transfer corona wire.
 c. Clean the inside of the printer.
 d. Clean the primary corona wire.
 e. Adjust the print density.
 f. Check the paper type and quality (see Appendix D).
 g. If the above steps don't help, replace the EP-S cartridge.

4. Can you send print data to the printer from your computer?

 YES - go to question 5.

 NO - Check the following:

 a. The printer is on-line.
 b. The proper interface cable was selected and is securely connected to the printer and the computer.
 c. The printer is configured correctly (see *Your Guide to Setting Up Your LaserJet III Printer*).
 d. A self test verifies the interface configurations shown on the printout match those on your host computer.
 e. The computer is working properly by running an application you know works.
 f. The computer's port is working properly by running another peripheral connected to the port.
 g. The computer's operating system configuration files (such as `autoexec.bat`) are set up properly for access by the host application.

5. Do your Control Panel settings work correctly?

 YES - go to question 6.

 NO - check the following:

 a. The printer was off-line when you attempted to change the printer settings.
 b. You are pressing the control panel keys for the right amount of time.
 c. Change the settings again as described in Chapter 4.
 d. If you still have problems, consult your application software documentation or the *LaserJet III Printer Technical Reference Manual.*

6. Is your print data being completely printed?

 YES - If you experience a problem not described in this checklist, and no messages appear in the display, perform the maintenance described in this chapter. If you still need help, call the Personal Peripherals Assist Line for assistance (see Chapter 8).

 NO–check the following:

 a. If the Form Feed indicator is on, take the printer off-line and press (Form Feed) to print the page stored in the printer. (Alternately, you can add a form feed character to the end of your print file.)
 b. If no error message is displayed, but you are losing data, check your application software to be sure the print files contain no errors. If there is an error message displayed, refer to page 7-7 for help.

If these suggestions have not helped you resolve your problems, contact your dealer or the Hewlett-Packard Personal Peripherals Assist Line (see Chapter 8).

8

Service and Support

Introduction

Hewlett-Packard and its authorized dealers stand behind the HP product you have purchased. Depending on how you purchase and use your equipment, the best source of support may be your HP dealer, your own organization, or the Hewlett-Packard Company. Your warranty statement is included in this chapter (see "Warranty"). Please read it carefully and retain it for your records.

Assistance From Your Organization

If your organization has many HP printers, the best source of assistance may be within your own company. Many companies designate central support personnel to help you when you have any problems with your printer, or when you need consumable items such as EP-S cartridges or paper. These support personnel, in turn, can call special resources within HP when necessary.

Assistance From Your Local Dealer

If you purchased your printer from an HP dealer or large system vendor, your dealer is the best source of assistance. Your salesperson is familiar with your needs, equipment, configuration and software and should be able to provide you with the information you need. Your dealer can also access special support resources and programs within HP. Contact your dealer for details on available support options.

Help From the Personal Peripherals Assist Line

If your organization's support personnel or your dealer are unable to answer your question, Hewlett-Packard has a Personal Peripherals Assist Line available for you. The Assist Line answers questions on topics such as using fonts or changing the toner cartridge. It is available from 7AM until 6PM (Mountain Standard Time) on Monday, Tuesday, Thursday and Friday, and 7AM until 4PM on Wednesday.



(208) - 323-2551

Before you call the Personal Peripherals Assist Line, make sure you do the following:

- Check the troubleshooting information and checklist in Chapter 7, which provides extensive help for identifying and correcting most common problems.
- Use the control panel to print a self test printout, if possible.
- Check with your software vendor for help if you suspect a software problem.
- Complete the LaserJet III Printer Set-up Information Sheet on page 1-10. Have the information available when you call.

Assistance From HP — Hardware Support

Recognizing that mechanical parts do wear, and that electronic devices do occasionally need service, high-quality, professional hardware support is provided through *HP Personal Computer Dealer Centers* and the world-wide network of *HP Sales and Service Offices.* These offices are listed following the index.

Note



To have your printer serviced by Hewlett-Packard, you must make arrangements to have it serviced in the country of purchase.

HP Maintenance Agreements

HP has several types of maintenance agreements that meet a wide range of support needs.

On-Site Service Agreements

To provide you with the support level best suited to your system usage and support budget, HP has on-site service agreements with three response times.

Priority On-Site Service is designed for production critical applications, giving you four-hour service response to your site for calls made during normal HP business hours.

Next Day On-Site Service provides on-site support by the next working day following your service request. Extended coverage hours and extended travel beyond HP designated service zones are available for additional charges on most on-site service agreements.

Weekly (Volume) On-Site Service Agreement, for organizations with many HP LaserJet printers, provides economical, scheduled on-site coverage. Designated for customer sites using 25 or more workstation products, this service provides scheduled weekly repair visits to your central location. HP can write an agreement for any combination of 25 or more workstation products including printers, plotters, computers and disk drives.

Customer Return Service

With *Customer Return Service,* you send the printer to a nearby HP Customer Service Center, where your product will be repaired, tested and return-shipped within three working days. This agreement is the most economical service, and you get higher-priority service than per-incident repairs. An additional benefit is that you can accurately budget support costs with no unexpected expenses.

Per-Incident Repair Services

In addition to contractual services, HP offers per-incident services. Standard Repair Price (STREP) is available at HP Customer Service centers listed in the *Worldwide Sales and Support Directory* found in the last pages of this manual. (If no Repair Center is listed in your city or country, contact an HP Sales and Service Office or call (800) 835-HPHP for assistance.) Your product will be repaired at a fixed price regardless of the time and parts required to accomplish the task. Repairs are typically completed within five working days of receipt at the HP Customer Service Centers.

Time-and-materials service is also available and generally applies to per-incident repairs provided on-site.

Warranty

This warranty gives you specific legal rights. You may also have other rights which vary from state to state or province to province.

One-Year Limited Warranty

Hewlett-Packard warrants its computer hardware products against defects in materials and workmanship for a period of one year from receipt by the end user. During the warranty period, HP will, at its option, either repair or replace products which prove to be defective.

Should HP be unable to repair or replace the product within a reasonable amount of time, a refund of the purchase price may be given upon return of the product.

Exclusions

The warranty on your LaserJet III printer shall not apply to defects resulting from:

- Improper or inadequate maintenance by customer.
- Customer supplied software or interfacing.
- Unauthorized modification or misuse.
- Operation outside of the environmental specifications for the product.
- Operation of non-supported printing media.
- Duty cycle abuse (see note on next page).
- Operating the printer from a mechanical switchbox without a designated surge protector.
- Improper site preparation and maintenance.
- Use of non-HP EP-S cartridges, memory boards or interface boards.

Note

Operation of the printer beyond the limit of its duty cycle (printing greater than the equivalent of 12,000 single-sided pages per month) shall be deemed printer abuse and all repairs thereafter will be billed on a time and materials basis.

If you are using a mechanical switchbox, ensure that it is equipped with a surge protector. Damage to your printer could occur from the use of unprotected mechanical switchboxes.

The warranty period begins either on the date of delivery or, where the purchase price includes installation by Hewlett-Packard, on the date of installation.

Your LaserJet III printer must be serviced by one of the authorized repair depots within the country of original purchase. Customer shall prepay shipping charges (and shall pay all duty and taxes) for products returned for service. Except for products returned to the customer from another country, Hewlett-Packard shall pay for return of products to the customer. If the unit is repaired by an authorized dealer, you will need to negotiate the method and cost of returning the unit with the dealer.

You may convert your one-year warranty to a 90-day on-site service agreement any time within 90 days of purchase. Refer to your dealer or HP Sales Representative for details regarding this option.

Warranty Limitations

The warranty set forth above is exclusive and no other warranty, whether written or oral, is expressed or implied. Hewlett-Packard specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

Some states or provinces do not allow limitations on how long an implied warranty lasts, so the above limitation or

exclusion may not apply to you. However, any implied warranty of merchantability or fitness is limited to the one-year duration of this written warranty.

Service During the Warranty Period

If your hardware should fail during the warranty period, bring the failed piece of equipment to an authorized HP Dealer Repair Center, or send the equipment to one of the HP Field Repair Centers.

When sending equipment to an HP Field Repair Center or Dealer Repair Center, follow the repacking guidelines listed below. Also, complete and enclose the Service Information Form beginning on page 8-9 and insure the equipment for shipment.

Warning



Shipping damage as a result of inadequate packaging is the customer's responsibility. Use the original packing materials whenever possible.

Service After the Warranty Period

If your hardware fails after the warranty period, contact an Authorized HP Dealer Repair Center. If you have an HP Maintenance Agreement, request service under your agreement.

When sending equipment to an HP Field Repair Center, follow the repacking guidelines (listed page 8-8). Also, complete and enclose the Service Information Form (beginning on page 8-9), enclose a copy of proof of purchase, and insure the equipment for shipment.

Repacking Guidelines for Returning Your Printer

- Remove any font cartridges installed in the printer.
- Remove the EP-S cartridge.
- Remove any optional memory (if installed).
- Remove paper trays, but include in the box with the printer.
- Use the original shipping container and packing materials, if possible.
- Include the completed Service Information Form. Include print samples which illustrate the problems you are having, if applicable.
- Include 50-100 sheets of any problem paper or forms, if possible.

Note



If you have already disposed of your printer's packaging material and are unable to locate another package, the packaging can be ordered from HP's Support Materials Organization at the following phone numbers:

800-227-8164 (U.S.)
416-678-9430 (Canada)
41-22-83-81-11 (Europe)

Ask for part number 33449-00908. The proper packaging material (box and inserts) will be sent to you for a nominal charge.

Service Information Form

(For HP Field Repair Center or an authorized HP Dealer Repair Center)

(Please call 800-835-4747 to locate the authorized service center in your area.)

When requesting service, please fill out this Service Information Form. This Form needs to be shipped with your equipment. Service cannot begin until we have this information.

Who Is Returning This Equipment?

Company/Institution _____ Date _____

Person to Contact _____ Phone _____

Alternate Contact _____ Phone _____

Return Shipping Address:

Special Shipping Instructions:

How Will You Pay For The Repair?

(Fill in the information in the appropriate box.)

Warranty

Purchased/Received Date _____
Enclose proof of purchase or receiving document indicating original received date.

Maintenance Contract

Contract No. _____

Order

EXCEPT FOR CONTRACT AND WARRANTY SERVICES, A PURCHASE ORDER NUMBER AND/OR AUTHORIZED SIGNATURE MUST ACCOMPANY ANY REQUEST FOR SERVICE. If standard repair prices do not apply, a minimum purchase order is required. Standard repair prices may be obtained by contacting a Repair Center.

Purchase Order No. _____

Billing Address:

Special Billing Instructions:

Authorized Signature _____

Phone _____

What Is Being Sent?

Model No. _____ Serial No. _____

Be sure that you have followed the procedures in Chapter 7 (Troubleshooting) in the *LaserJet III User's Manual* before returning equipment. Don't ship accessories which are not required to complete the repair (manuals, cleaning supplies, etc.)

What Needs To Be Done?

1. Describe the conditions at the time of failure. (What were you doing when the failure occurred? What software were you running? Is the failure repeatable?)

2. If failure is intermittent, how much time elapses between failures?

3. Is the unit connected to any of the following? (Give manufacturer and model number.)

 Disk Unit _____ Modem _____

 Other _____

4. Additional Comments:

5. Please attach any relevant printouts when returning equipment.

Thank You.

Commonly Asked Questions



Hewlett-Packard has support services available to help you in case you have questions about your LaserJet III printer. Before you call for help, read the following list of questions our customers commonly ask:

Q: What is the benefit of using the Centronics parallel interface over the serial interface?

A: Using the Centronics parallel interface, you can transfer raster graphics data and large fonts to the printer much faster than the serial interface.

Q: Is there any way that I can create a document on my IBM PC that uses the IBM Line-drawing set, and have it print correctly on my printer?

A: Yes, the printer contains the PC-8 symbol set, which you can access using your software or the control panel Printing Menu selection `SYM SET= PC-8`.

Q: I am using a proportionally spaced font. How do I get an even right margin?

A: Right justification with proportionally spaced fonts is a feature of the software package. Determine if your software provides right justification of proportionally spaced fonts.

Q: How do I access the two levels of control panel menu options - the Printing Menu and the Configuration Menu?

A: To access the Printing Menu, first take the printer off-line. Then press Menu *and step through the selections that control the printed output. To access the Configuration Menu, first take the printer off-line, then press and hold* Menu *for approximately 7 seconds, until* `AUTO CONT=OFF` *(or* `ON`*) appears in the display.*

Q: I have printed a Font Printout and am trying to access the internal font for Courier bold, #I04. When I use the printer command $^{E}_{C}$(#X for accessing a font by its ID number, the printer does not recognize that command? What am I doing wrong?

A: You cannot access the internal or cartridge fonts using the above escape sequence. You can use this sequence only to access soft fonts that you have previously downloaded and assigned an ID number. Don't confuse the font # and the soft font ID; they are not the same.

Q: What kind of paper should I use with my LaserJet III printer?

A: The LaserJet III printer works well with most types of paper. Variables in paper composition and manufacturing may affect print quality and paper handling. Refer to Appendix D for more detailed paper specifications.

Q: I replaced my EP-S cartridge and now nothing is printing, why?

A: Make sure you removed the sealing tape from the EP-S cartridge

Q: Can my EP-S toner cartridge be refilled when it runs out of toner or do I have to purchase a new one?

A: HP does not recommend the use of refilled toner cartridges. The electrophotographic drum and the corona (located in the EP-S cartridge) are exceeding their designed life when the toner runs out. Damage to the printer resulting from the use of a refilled cartridge will not be covered by HP.

Q: Why does the first page of my document print with the correct top margin, but then following pages start printing lower, with a larger top margin?

A: Creeping text occurs when the number of lines per page in your software application exceeds the number of lines per page set for the printer. The printer has a default

unprintable region of 3 lines at both the top and bottom of the page, and by default prints 60 lines per page (on 11-inch paper). Most software applications default to 66 lines per page. Set your application software to send only 60 lines per page.

Q: I do not have a LaserJet III printer driver available with my software. What should I use?

A: If a LaserJet III printer driver is not available, select the driver definition that is the closest to the printer's features. First try LaserJet IID, then LaserJet series II or LaserJet 2000 printer drivers. Then call your application vendor for information concerning LaserJet III printer support.

Q: Can my LaserJet III printer support other printer languages?

A: Yes! Although your LaserJet III printer is capable of far more features through the PCL 5 language than ever before. HP now provides PostScript, IBM, and Epson printer language support. You can order personality cartridges, which are used like font cartridges, through HP's Direct Marketing Division (see page* vii*). Also see your* Supplies and Accessories Brochure *for additional information.*

A

Symbol Sets

Symbol Set Tables

This section includes symbol set tables showing character locations and decimal addresses. Individual tables are provided for the following symbol sets:

Roman-8	Ventura US
ECMA-94 Latin 1	PS Math
PC-8	PS Text
PC-8 D/N	Math-8
PC-850	Pi Font
Legal	Microsoft Publishing
Ventura Math	Windows
Ventura International	DeskTop

The shaded areas in these tables denote printer control code areas. Refer to your computer or software manuals for information on printing the characters shown in the right half of the tables.

The International Standards Organization (ISO) symbol sets and the HP German and HP Spanish symbol sets are represented by a character substitution table (see page A-18).

Software Support

All of the characters and symbols in the unshaded portions of these charts are directly printable. Your software, however, might not support some of them. Check your software manual to see which symbol sets are supported.

Roman-8 Symbol Set

Includes ASCII and Roman Extension Symbol Sets

NUL 0	DLE 16	 32	0 48	@ 64	P 80	‘ 96	p 112	 128	 144	 160	¯ 176	â 192	Å 208	Á 224	Þ 240
SOH 1	DC1 17	! 33	1 49	A 65	Q 81	a 97	q 113	 129	 145	À 161	Ý 177	ê 193	î 209	Ã 225	þ 241
STX 2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	 130	 146	Â 162	ý 178	ô 194	Ø 210	ã 226	· 242
ETX 3	DC3 19	# 35	3 51	C 67	S 83	c 99	s 115	 131	 147	È 163	° 179	û 195	Æ 211	Đ 227	µ 243
EOT 4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	 132	 148	Ê 164	Ç 180	á 196	å 212	ð 228	¶ 244
ENQ 5	NAK 21	% 37	5 53	E 69	U 85	e 101	u 117	 133	 149	Ë 165	ç 181	é 197	í 213	Í 229	¾ 245
ACK 6	SYN 22	& 38	6 54	F 70	V 86	f 102	v 118	 134	 150	Î 166	Ñ 182	ó 198	ø 214	Ì 230	— 246
BEL 7	ETB 23	’ 39	7 55	G 71	W 87	g 103	w 119	 135	 151	Ï 167	ñ 183	ú 199	æ 215	Ó 231	¼ 247
BS 8	CAN 24	(40	8 56	H 72	X 88	h 104	x 120	 136	 152	´ 168	¡ 184	à 200	Ä 216	Ò 232	½ 248
HT 9	EM 25	) 41	9 57	I 73	Y 89	i 105	y 121	 137	 153	` 169	¿ 185	è 201	ì 217	Õ 233	a 249
LF 10	SUB 26	* 42	: 58	J 74	Z 90	j 106	z 122	 138	 154	^ 170	¤ 186	ò 202	Ö 218	õ 234	o 250
VT 11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	 139	 155	¨ 171	£ 187	ù 203	Ü 219	Š 235	« 251
FF 12	FS 28	, 44	< 60	L 76	\ 92	l 108	\| 124	 140	 156	~ 172	¥ 188	ä 204	É 220	š 236	■ 252
CR 13	GS 29	- 45	= 61	M 77	] 93	m 109	} 125	 141	 157	Ù 173	§ 189	ë 205	ï 221	Ú 237	» 253
SO 14	RS 30	. 46	> 62	N 78	^ 94	n 110	~ 126	 142	 158	Û 174	*f* 190	ö 206	ß 222	Ÿ 238	± 254
SI 15	US 31	/ 47	? 63	O 79	_ 95	o 111	 127	 143	 159	£ 175	ç 191	ü 207	Ô 223	ÿ 239	 255

ECMA-94 Latin 1 Symbol Set

NUL 0	DLE 16	 32	0 48	@ 64	P 80	` 96	p 112	 128	 144	 160	° 176	À 192	Ð 208	à 224	ð 240
SOH 1	DC1 17	! 33	1 49	A 65	Q 81	a 97	q 113	 129	 145	¡ 161	± 177	Á 193	Ñ 209	á 225	ñ 241
STX 2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	 130	 146	ç 162	2 178	Â 194	Ò 210	â 226	ò 242
ETX 3	DC3 19	# 35	3 51	C 67	S 83	c 99	s 115	 131	 147	£ 163	3 179	Ã 195	Ó 211	ã 227	ó 243
EOT 4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	 132	 148	¤ 164	´ 180	Ä 196	Ô 212	ä 228	ô 244
ENQ 5	NAK 21	% 37	5 53	E 69	U 85	e 101	u 117	 133	 149	¥ 165	µ 181	Å 197	Õ 213	å 229	õ 245
ACK 6	SYN 22	& 38	6 54	F 70	V 86	f 102	v 118	 134	 150	¦ 166	¶ 182	Æ 198	Ö 214	æ 230	ö 246
BEL 7	ETB 23	' 39	7 55	G 71	W 87	g 103	w 119	 135	 151	§ 167	· 183	Ç 199	× 215	ç 231	÷ 247
BS 8	CAN 24	(40	8 56	H 72	X 88	h 104	x 120	 136	 152	¨ 168	¸ 184	È 200	Ø 216	è 232	ø 248
HT 9	EM 25	) 41	9 57	I 73	Y 89	i 105	y 121	 137	 153	© 169	1 185	É 201	Ù 217	é 233	ù 249
LF 10	SUB 26	* 42	: 58	J 74	Z 90	j 106	z 122	 138	 154	a 170	o 186	Ê 202	Ú 218	ê 234	ú 250
VT 11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	 139	 155	« 171	» 187	Ë 203	Û 219	ë 235	û 251
FF 12	FS 28	, 44	< 60	L 76	\ 92	l 108	\| 124	 140	 156	¬ 172	¼ 188	Ì 204	Ü 220	ì 236	ü 252
CR 13	GS 29	- 45	= 61	M 77	] 93	m 109	} 125	 141	 157	- 173	½ 189	Í 205	Ý 221	í 237	ý 253
SO 14	RS 30	. 46	> 62	N 78	^ 94	n 110	~ 126	 142	 158	® 174	¾ 190	Î 206	Þ 222	î 238	þ 254
SI 15	US 31	/ 47	? 63	O 79	_ 95	o 111	 127	 143	 159	¯ 175	¿ 191	Ï 207	ß 223	ï 239	ÿ 255

PC-8 Symbol Set

NUL	►		0	@	P	`	p	Ç	É	á	▒	└	╨	α	≡
0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240
☺	◄	!	1	A	Q	a	q	ü	æ	í	▓	┴	╤	ß	±
1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
☻	↕	"	2	B	R	b	r	é	Æ	ó	▓	┬	╥	Γ	≥
2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
♥	‼	#	3	C	S	c	s	â	ô	ú	\|	├	╙	π	≤
3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243
♦	¶	$	4	D	T	d	t	ä	ö	ñ	┤	—	╘	Σ	⌠
4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244
♣	§	%	5	E	U	e	u	à	ò	Ñ	╡	┼	╒	σ	⌡
5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245
♠	▬	&	6	F	V	f	v	å	û	ª	╢	╞	╓	µ	÷
6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246
•	↨	'	7	G	W	g	w	ç	ù	º	╖	╟	╫	τ	≈
7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247
◘	↑	(	8	H	X	h	x	ê	ÿ	¿	╕	╚	╪	Φ	°
8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248
○	↓	)	9	I	Y	i	y	ë	Ö	⌐	╣	╔	┘	Θ	·
9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249
◙	→	*	:	J	Z	j	z	è	Ü	¬	║	╩	┌	Ω	·
10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250
♂	←	+	;	K	[	k	{	ï	¢	½	╗	╦	▉	δ	√
11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251
♀	∟	,	<	L	\	l	\|	î	£	¼	╝	╠	▂	∞	n
12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252
♪	↔	-	=	M	]	m	}	ì	¥	¡	╜	═	▌	ϕ	2
13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253
♫	▲	.	>	N	^	n	~	Ä	Pt	«	╛	╬	▐	ϵ	■
14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254
☼	▼	/	?	O	_	o	⌂	Å	*f*	»	┐	╧	▃	∩	
15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255

PC-8 D/N (Danish/Norwegian) Symbol Set

NUL 0	► 16	 32	0 48	@ 64	P 80	` 96	p 112	Ç 128	É 144	á 160	▒ 176	└ 192	╨ 208	α 224	≡ 240
☺ 1	◄ 17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	æ 145	í 161	▓ 177	┴ 193	╤ 209	ß 225	± 241
☻ 2	↕ 18	" 34	2 50	B 66	R 82	b 98	r 114	é 130	Æ 146	ó 162	▓ 178	┬ 194	╥ 210	Γ 226	≥ 242
♥ 3	‼ 19	# 35	3 51	C 67	S 83	c 99	s 115	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243
♦ 4	¶ 20	$ 36	4 52	D 68	T 84	d 100	t 116	ä 132	ö 148	ñ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244
♣ 5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117	à 133	ò 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245
♠ 6	▬ 22	& 38	6 54	F 70	V 86	f 102	v 118	å 134	û 150	õ 166	╢ 182	╞ 198	╓ 214	μ 230	÷ 246
• 7	↨ 23	' 39	7 55	G 71	W 87	g 103	w 119	ç 135	ù 151	Õ 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247
◘ 8	↑ 24	(40	8 56	H 72	X 88	h 104	x 120	ê 136	ÿ 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248
○ 9	↓ 25	) 41	9 57	I 73	Y 89	i 105	y 121	ë 137	Ö 153	ã 169	╣ 185	╔ 201	┘ 217	Θ 233	· 249
◙ 10	→ 26	* 42	: 58	J 74	Z 90	j 106	z 122	è 138	Ü 154	Ã 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
♂ 11	← 27	+ 43	; 59	K 75	[91	k 107	{ 123	ï 139	ø 155	ℓ 171	╗ 187	╦ 203	■ 219	δ 235	√ 251
♀ 12	∟ 28	, 44	< 60	L 76	\ 92	l 108	\| 124	î 140	£ 156	ʼn 172	╝ 188	╠ 204	▬ 220	∞ 236	n 252
♪ 13	↔ 29	- 45	= 61	M 77	] 93	m 109	} 125	ì 141	Ø 157	¡ 173	╜ 189	═ 205	▌ 221	ϕ 237	2 253
♫ 14	▲ 30	. 46	> 62	N 78	^ 94	n 110	~ 126	Ä 142	Ł 158	3 174	╛ 190	╬ 206	▐ 222	∈ 238	■ 254
☼ 15	▼ 31	/ 47	? 63	O 79	_ 95	o 111	⌂ 127	Å 143	ł 159	¤ 175	┐ 191	╧ 207	▄ 223	∩ 239	 255

PC-850 Symbol Set

NUL	►		0	@	P	`	p	Ç	É	á	▒	└	ð	Ó	-
0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240
☺	◄	!	1	A	Q	a	q	ü	æ	í	▓	┴	Đ	ß	±
1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
☻	↕	"	2	B	R	b	r	é	Æ	ó	▒	┬	Ê	Ô	‗
2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
♥	‼	#	3	C	S	c	s	â	ô	ú	│	├	Ë	Ò	¾
3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243
♦	¶	$	4	D	T	d	t	ä	ö	ñ	┤	─	È	õ	¶
4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244
♣	§	%	5	E	U	e	u	à	ò	Ñ	Á	┼	ı	Õ	§
5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245
♠	▬	&	6	F	V	f	v	å	û	ª	Â	ã	Í	µ	÷
6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246
•	↨	'	7	G	W	g	w	ç	ù	º	À	Ã	Î	þ	¸
7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247
◘	↑	(	8	H	X	h	x	ê	ÿ	¿	©	╚	Ï	Þ	°
8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248
○	↓	)	9	I	Y	i	y	ë	Ö	®	╣	╔	┘	Ú	¨
9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249
◙	→	*	:	J	Z	j	z	è	Ü	¬	║	╩	┌	Û	·
10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250
♂	←	+	;	K	[	k	{	ï	ø	½	╗	╦	■	Ù	1
11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251
♀	∟	,	<	L	\	l	\|	î	£	¼	╝	╠	▄	ý	3
12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252
♪	↔	-	=	M	]	m	}	ì	Ø	¡	ç	═	¦	Ý	2
13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253
♫	▲	.	>	N	^	n	~	Ä	×	«	¥	╬	Ì	¯	■
14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254
☼	▼	/	?	O	_	o	⌂	Å	ƒ	»	┐	¤	▀	´	
15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255

Legal Symbol Set

NUL 0	DLE 16	 32	0 48	@ 64	P 80	° 96	p 112	 128	 144	 160	 176	 192	 208	 224	 240
SOH 1	DC1 17	! 33	1 49	A 65	Q 81	a 97	q 113	 129	 145	 161	 177	 193	 209	 225	 241
STX 2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	 130	 146	 162	 178	 194	 210	 226	 242
ETX 3	DC3 19	# 35	3 51	C 67	S 83	c 99	s 115	 131	 147	 163	 179	 195	 211	 227	 243
EOT 4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	 132	 148	 164	 180	 196	 212	 228	 244
ENQ 5	NAK 21	% 37	5 53	E 69	U 85	e 101	u 117	 133	 149	 165	 181	 197	 213	 229	 245
ACK 6	SYN 22	& 38	6 54	F 70	V 86	f 102	v 118	 134	 150	 166	 182	 198	 214	 230	 246
BEL 7	ETB 23	' 39	7 55	G 71	W 87	g 103	w 119	 135	 151	 167	 183	 199	 215	 231	 247
BS 8	CAN 24	(40	8 56	H 72	X 88	h 104	x 120	 136	 152	 168	 184	 200	 216	 232	 248
HT 9	EM 25	) 41	9 57	I 73	Y 89	i 105	y 121	 137	 153	 169	 185	 201	 217	 233	 249
LF 10	SUB 26	* 42	: 58	J 74	Z 90	j 106	z 122	 138	 154	 170	 186	 202	 218	 234	 250
VT 11	ESC 27	+ 43	; 59	K 75	[91	k 107	§ 123	 139	 155	 171	 187	 203	 219	 235	 251
FF 12	FS 28	, 44	= 60	L 76	® 92	l 108	¶ 124	 140	 156	 172	 188	 204	 220	 236	 252
CR 13	GS 29	- 45	= 61	M 77	] 93	m 109	† 125	 141	 157	 173	 189	 205	 221	 237	 253
SO 14	RS 30	. 46	¢ 62	N 78	© 94	n 110	™ 126	 142	 158	 174	 190	 206	 222	 238	 254
SI 15	US 31	/ 47	? 63	O 79	_ 95	o 111	 127	 143	 159	 175	 191	 207	 223	 239	 255

Ventura Math Symbol Set

NUL 0	DLE 16	32	0 48	≅ 64	Π 80	‾ 96	π 112	128	144	◇ 160	® 176	≤ 192	↓ 208	\| 224	∏ 240
SOH 1	DC1 17	! 33	1 49	A 65	Θ 81	α 97	θ 113	129	145	√ 161	⊃ 177	♦ 193	← 209	· 225	™ 241
STX 2	DC2 18	∀ 34	2 50	B 66	P 82	β 98	ρ 114	130	146	⌊ 162	⊇ 178	≥ 194	® 210	∠ 226	⇐ 242
ETX 3	DC3 19	# 35	3 51	X 67	Σ 83	χ 99	σ 115	131	147	⌈ 163	⌠ 179	∂ 195	″ 211	⌡ 227	⇔ 243
EOT 4	DC4 20	∃ 36	4 52	Δ 68	T 84	δ 100	τ 116	132	148	\| 164	180	ℵ 196	*f* 212	228	∨ 244
ENQ 5	NAK 21	% 37	5 53	E 69	Y 85	ε 101	υ 117	133	149	⌊ 165	♣ 181	′ 197	ℑ 213	{ 229	Σ 245
ACK 6	SYN 22	& 38	6 54	Φ 70	ς 86	φ 102	ϖ 118	134	150	⌊ 166	⊕ 182	ℜ 198	© 214	⌠ 230	™ 246
BEL 7	ETB 23	∋ 39	7 55	Γ 71	Ω 87	γ 103	ω 119	135	151	\| 167	⊗ 183	℘ 199	± 215	⟩ 231	\| 247
BS 8	CAN 24	(40	8 56	H 72	Ξ 88	η 104	ξ 120	136	152	⇑ 168	⊆ 184	∞ 200	→ 216	232	⌋ 248
HT 9	EM 25	) 41	9 57	I 73	Ψ 89	ι 105	ψ 121	137	153	⇒ 169	∪ 185	♠ 201	↑ 217	¬ 233	∅ 249
LF 10	SUB 26	* 42	: 58	ϑ 74	Z 90	φ 106	ζ 122	138	154	⇓ 170	— 186	∝ 202	≠ 218	∇ 234	∩ 250
VT 11	ESC 27	+ 43	; 59	K 75	[91	κ 107	{ 123	139	155	⊄ 171	… 187	• 203	≡ 219	⌠ 235	∈ 251
FF 12	FS 28	, 44	< 60	Λ 76	∴ 92	λ 108	\| 124	140	156	⊂ 172	\| 188	/ 204	° 220	\| 236	© 252
CR 13	GS 29	− 45	= 61	M 77	] 93	μ 109	} 125	141	157	⌡ 173	∧ 189	♥ 205	↔ 221	⌉ 237	∉ 253
SO 14	RS 30	. 46	> 62	N 78	⊥ 94	ν 110	~ 126	142	158	\| 174	↵ 190	× 206	⌉ 222	⌡ 238	⌉ 254
SI 15	US 31	/ 47	? 63	O 79	_ 95	*o* 111	127	143	159	} 175	≈ 191	ϒ 207	∫ 223	÷ 239	⟨ 255

Ventura International Symbol Set

NUL 0	DLE 16	 32	0 48	@ 64	P 80	‘ 96	p 112	 128	 144	„ 160	‰ 176	â 192	Å 208	Á 224	Œ 240
SOH 1	DC1 17	! 33	1 49	A 65	Q 81	a 97	q 113	 129	 145	À 161	“ 177	ê 193	î 209	Ã 225	œ 241
STX 2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	 130	 146	Â 162	” 178	ô 194	Ø 210	ã 226	¶ 242
ETX 3	DC3 19	# 35	3 51	C 67	S 83	c 99	s 115	 131	 147	È 163	° 179	û 195	Æ 211	 227	† 243
EOT 4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	 132	 148	Ê 164	Ç 180	á 196	å 212	 228	‡ 244
ENQ 5	NAK 21	% 37	5 53	E 69	U 85	e 101	u 117	 133	 149	Ë 165	ç 181	é 197	í 213	Í 229	— 245
ACK 6	SYN 22	& 38	6 54	F 70	V 86	f 102	v 118	 134	 150	Î 166	Ñ 182	ó 198	ø 214	Ì 230	– 246
BEL 7	ETB 23	’ 39	7 55	G 71	W 87	g 103	w 119	 135	 151	Ï 167	ñ 183	ú 199	æ 215	Ó 231	 247
BS 8	CAN 24	(40	8 56	H 72	X 88	h 104	x 120	 136	 152	© 168	¡ 184	à 200	Ä 216	Ò 232	 248
HT 9	EM 25	) 41	9 57	I 73	Y 89	i 105	y 121	 137	 153	® 169	¿ 185	è 201	ì 217	Õ 233	a 249
LF 10	SUB 26	* 42	: 58	J 74	Z 90	j 106	z 122	 138	 154	™ 170	¤ 186	ò 202	Ö 218	õ 234	o 250
VT 11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	 139	 155	‹ 171	£ 187	ù 203	Ü 219	Š 235	« 251
FF 12	FS 28	, 44	< 60	L 76	\ 92	l 108	\| 124	 140	 156	› 172	¥ 188	ä 204	É 220	š 236	• 252
CR 13	GS 29	- 45	= 61	M 77	] 93	m 109	} 125	 141	 157	Ù 173	§ 189	ë 205	ï 221	Ú 237	» 253
SO 14	RS 30	. 46	> 62	N 78	^ 94	n 110	~ 126	 142	 158	Û 174	*f* 190	ö 206	ß 222	Ÿ 238	 254
SI 15	US 31	/ 47	? 63	O 79	_ 95	o 111	 127	 143	 159	 175	ç 191	ü 207	Ô 223	ÿ 239	… 255

Ventura US Symbol Set

NUL 0	DLE 16	 32	0 48	@ 64	P 80	‘ 96	p 112	 128	 144	” 160	‰ 176	 192	 208	 224	 240
SOH 1	DC1 17	! 33	1 49	A 65	Q 81	a 97	q 113	 129	 145	 161	“ 177	 193	 209	 225	 241
STX 2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	 130	 146	 162	” 178	 194	 210	 226	¶ 242
ETX 3	DC3 19	# 35	3 51	C 67	S 83	c 99	s 115	 131	 147	 163	° 179	 195	 211	 227	† 243
EOT 4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	 132	 148	 164	 180	 196	 212	 228	‡ 244
ENQ 5	NAK 21	% 37	5 53	E 69	U 85	e 101	u 117	 133	 149	 165	 181	 197	 213	 229	— 245
ACK 6	SYN 22	& 38	6 54	F 70	V 86	f 102	v 118	 134	 150	 166	 182	 198	 214	 230	– 246
BEL 7	ETB 23	’ 39	7 55	G 71	W 87	g 103	w 119	 135	 151	 167	 183	 199	 215	 231	 247
BS 8	CAN 24	(40	8 56	H 72	X 88	h 104	x 120	 136	 152	© 168	 184	 200	 216	 232	 248
HT 9	EM 25	) 41	9 57	I 73	Y 89	i 105	y 121	 137	 153	® 169	 185	 201	 217	 233	 249
LF 10	SUB 26	* 42	: 58	J 74	Z 90	j 106	z 122	 138	 154	™ 170	 186	 202	 218	 234	 250
VT 11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	 139	 155	 171	 187	 203	 219	 235	 251
FF 12	FS 28	, 44	< 60	L 76	\ 92	l 108	\| 124	 140	 156	 172	 188	 204	 220	 236	• 252
CR 13	GS 29	- 45	= 61	M 77	] 93	m 109	} 125	 141	 157	 173	§ 189	 205	 221	 237	 253
SO 14	RS 30	. 46	> 62	N 78	^ 94	n 110	~ 126	 142	 158	 174	 190	 206	 222	 238	 254
SI 15	US 31	/ 47	? 63	O 79	_ 95	o 111	 127	 143	 159	 175	¿ 191	 207	 223	 239	... 255

PS Math Symbol Set

NUL 0	DLE 16	32	0 48	≅ 64	Π 80	¯ 96	π 112	128	144	160	° 176	ℵ 192	∠ 208	◇ 224	240
SOH 1	DC1 17	! 33	1 49	A 65	Θ 81	α 97	θ 113	129	145	ϒ 161	± 177	ℑ 193	∇ 209	⟨ 225	⟩ 241
STX 2	DC2 18	∀ 34	2 50	B 66	P 82	β 98	ρ 114	130	146	′ 162	″ 178	ℜ 194	® 210	® 226	∫ 242
ETX 3	DC3 19	# 35	3 51	X 67	Σ 83	χ 99	σ 115	131	147	≤ 163	≥ 179	℘ 195	© 211	© 227	⌠ 243
EOT 4	DC4 20	∃ 36	4 52	Δ 68	T 84	δ 100	τ 116	132	148	/ 164	× 180	⊗ 196	™ 212	™ 228	⎮ 244
ENQ 5	NAK 21	% 37	5 53	E 69	Y 85	ε 101	υ 117	133	149	∞ 165	∝ 181	⊕ 197	∏ 213	∑ 229	⌡ 245
ACK 6	SYN 22	& 38	6 54	Φ 70	ς 86	φ 102	ϖ 118	134	150	f 166	∂ 182	∅ 198	√ 214	⎛ 230	⎞ 246
BEL 7	ETB 23	∋ 39	7 55	Γ 71	Ω 87	γ 103	ω 119	135	151	♣ 167	• 183	∩ 199	· 215	⎜ 231	⎟ 247
BS 8	CAN 24	(40	8 56	H 72	Ξ 88	η 104	ξ 120	136	152	♦ 168	÷ 184	∪ 200	¬ 216	⎝ 232	⎠ 248
HT 9	EM 25	) 41	9 57	I 73	Ψ 89	ι 105	ψ 121	137	153	♥ 169	≠ 185	⊃ 201	∧ 217	⎡ 233	⎤ 249
LF 10	SUB 26	* 42	: 58	ϑ 74	Z 90	φ 106	ζ 122	138	154	♠ 170	≡ 186	⊇ 202	∨ 218	⎢ 234	⎥ 250
VT 11	ESC 27	+ 43	; 59	K 75	[91	κ 107	{ 123	139	155	↔ 171	≈ 187	⊄ 203	⇔ 219	⎣ 235	⎦ 251
FF 12	FS 28	, 44	< 60	Λ 76	∴ 92	λ 108	\| 124	140	156	← 172	… 188	⊂ 204	⇐ 220	⎧ 236	⎫ 252
CR 13	GS 29	− 45	= 61	M 77	] 93	μ 109	} 125	141	157	↑ 173	\| 189	⊆ 205	⇑ 221	⎨ 237	⎬ 253
SO 14	RS 30	. 46	> 62	N 78	⊥ 94	ν 110	~ 126	142	158	→ 174	— 190	∈ 206	⇒ 222	⎩ 238	⎭ 254
SI 15	US 31	/ 47	? 63	O 79	_ 95	o 111	127	143	159	↓ 175	↵ 191	∉ 207	⇓ 223	⎪ 239	255

PS Text Symbol Set

NUL 0	DLE 16	32	0 48	@ 64	P 80	‘ 96	p 112	128	144	160	176	192	— 208	224	240
SOH 1	DC1 17	! 33	1 49	A 65	Q 81	a 97	q 113	129	145	¡ 161	– 177	` 193	209	Æ 225	æ 241
STX 2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	130	146	¢ 162	† 178	´ 194	210	226	242
ETX 3	DC3 19	# 35	3 51	C 67	S 83	c 99	s 115	131	147	£ 163	‡ 179	^ 195	211	a 227	243
EOT 4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	132	148	/ 164	· 180	~ 196	212	228	244
ENQ 5	NAK 21	% 37	5 53	E 69	U 85	e 101	u 117	133	149	¥ 165	181	¯ 197	213	229	ı 245
ACK 6	SYN 22	& 38	6 54	F 70	V 86	f 102	v 118	134	150	ƒ 166	¶ 182	˘ 198	214	230	246
BEL 7	ETB 23	’ 39	7 55	G 71	W 87	g 103	w 119	135	151	§ 167	• 183	¨ 199	215	231	247
BS 8	CAN 24	(40	8 56	H 72	X 88	h 104	x 120	136	152	¤ 168	¸ 184	¨ 200	216	Ł 232	ł 248
HT 9	EM 25	) 41	9 57	I 73	Y 89	i 105	y 121	137	153	' 169	” 185	201	217	Ø 233	ø 249
LF 10	SUB 26	* 42	: 58	J 74	Z 90	j 106	z 122	138	154	“ 170	” 186	° 202	218	Œ 234	œ 250
VT 11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	139	155	« 171	» 187	¸ 203	219	o 235	ß 251
FF 12	FS 28	, 44	< 60	L 76	\ 92	l 108	\| 124	140	156	‹ 172	… 188	204	220	236	252
CR 13	GS 29	- 45	= 61	M 77	] 93	m 109	} 125	141	157	› 173	‰ 189	˝ 205	221	237	253
SO 14	RS 30	. 46	> 62	N 78	^ 94	n 110	~ 126	142	158	fi 174	190	˛ 206	222	238	254
SI 15	US 31	/ 47	? 63	O 79	_ 95	o 111	127	143	159	fl 175	¿ 191	ˇ 207	223	239	255

Math-8 Symbol Set

NUL 0	DLE 16	 32	0 48	∴ 64	Π 80	∵ 96	π 112	 128	 144	 160	¯ 176	⊕ 192	Å 208	⌈ 224	⌉ 240
SOH 1	DC1 17	√ 33	1 49	A 65	P 81	α 97	ρ 113	 129	 145	↑ 161	∀ 177	⊙ 193	⊣ 209	⌊ 225	⌋ 241
STX 2	DC2 18	″ 34	2 50	B 66	Σ 82	β 98	σ 114	 130	 146	→ 162	∃ 178	⊗ 194	⊢ 210	⌠ 226	⌡ 242
ETX 3	DC3 19	° 35	3 51	Γ 67	T 83	γ 99	τ 115	 131	 147	↓ 163	⊤ 179	⊖ 195	⌙ 211	⎧ 227	⎫ 243
EOT 4	DC4 20	∞ 36	4 52	Δ 68	ϒ 84	δ 100	υ 116	 132	 148	← 164	⊥ 180	⊘ 196	∍ 212	⎩ 228	⎭ 244
ENQ 5	NAK 21	÷ 37	5 53	E 69	Φ 85	ϵ 101	ϕ 117	 133	 149	⇑ 165	∪ 181	∧ 197	∫ 213	⎮ 229	⎪ 245
ACK 6	SYN 22	∝ 38	6 54	Z 70	X 86	ζ 102	χ 118	 134	 150	⇒ 166	∩ 182	∨ 198	∮ 214	ϕ 230	⎪ 246
BEL 7	ETB 23	′ 39	7 55	H 71	Ψ 87	η 103	ψ 119	 135	 151	⇓ 167	∈ 183	⊻ 199	∠ 215	⌡ 231	⌟ 247
BS 8	CAN 24	(40	8 56	Θ 72	Ω 88	θ 104	ω 120	 136	 152	⇐ 168	∋ 184	¬ 200	∅ 216	⎷ 232	⌝ 248
HT 9	EM 25	) 41	9 57	I 73	∇ 89	ι 105	ϑ 121	 137	 153	⇕ 169	∉ 185	∘ 201	א 217	‖ 233	⟩ 249
LF 10	SUB 26	× 42	e 58	K 74	∂ 90	κ 106	φ 122	 138	 154	↔ 170	⊂ 186	· 202	ב 218	∠ 234	⌟ 250
VT 11	ESC 27	+ 43	ε 59	Λ 75	ς 91	λ 107	ϖ 123	 139	 155	⇳ 171	⊃ 187	• 203	ג 219	/ 235	\ 251
FF 12	FS 28	, 44	< 60	M 76	≤ 92	μ 108	≃ 124	 140	 156	⇔ 172	⊄ 188	● 204	ℭ 220	— 236	⟨ 252
CR 13	GS 29	− 45	= 61	N 77	≠ 93	ν 109	≡ 125	 141	 157	⇄ 173	⊅ 189	○ 205	ℑ 221	= 237	∓ 253
SO 14	RS 30	. 46	> 62	Ξ 78	≥ 94	ξ 110	≠ 126	 142	 158	⇆ 174	⊆ 190	† 206	ℜ 222	* 238	± 254
SI 15	US 31	/ 47	≈ 63	O 79	_ 95	o 111	▩ 127	 143	 159	⥾ 175	⊇ 191	‡ 207	ℨ 223	≅ 239	 255

Pi Font Symbol Set

NUL 0	DLE 16	 32	− 48	∷ 64	℘ 80	⌜ 96	⌝ 112	128	144	160	176	192	208	224	240
SOH 1	DC1 17	 33	˘ 49	≙ 65	℘ 81	⌞ 97	⌟ 113	129	145	161	177	193	209	225	241
STX 2	DC2 18	,, 34	ˇ 50	 66	℞ 82	⌜ 98	⌝ 114	130	146	162	178	194	210	226	242
ETX 3	DC3 19	, 35	· 51	 67	Σ 83	⌞ 99	⌟ 115	131	147	163	179	195	211	227	243
EOT 4	DC4 20	“ 36	↗ 52	 68	 84	┼ 100	┬ 116	132	148	164	180	196	212	228	244
ENQ 5	NAK 21	” 37	↘ 53	 69	 85	├ 101	┤ 117	133	149	165	181	197	213	229	245
ACK 6	SYN 22	‘ 38	↙ 54	ƒ 70	 86	— 102	┴ 118	134	150	166	182	198	214	230	246
BEL 7	ETB 23	’ 39	↖ 55	 71	 87	‖ 103	\| 119	135	151	167	183	199	215	231	247
BS 8	CAN 24	⟨ 40	△ 56	ℏ 72	 88	⋃ 104	⨿ 120	136	152	168	184	200	216	232	248
HT 9	EM 25	⟩ 41	▷ 57	 73	 89	⋂ 105	⨅ 121	137	153	169	185	201	217	233	249
LF 10	SUB 26	TM 42	▽ 58	 74	 90	⫿ 106	⫿ 122	138	154	170	186	202	218	234	250
VT 11	ESC 27	SM 43	◁ 59	 75	⟦ 91	⫿ 107	⫿ 123	139	155	171	187	203	219	235	251
FF 12	FS 28	® 44	⋘ 60	ℒ 76	‖ 92	□ 108	■ 124	140	156	172	188	204	220	236	252
CR 13	GS 29	© 45	§ 61	ℓ 77	⟧ 93	◇ 109	◆ 125	141	157	173	189	205	221	237	253
SO 14	RS 30	Ⓜ 46	⋙ 62	 78	‹ 94	 110	 126	142	158	174	190	206	222	238	254
SI 15	US 31	 47	¶ 63	 79	› 95	 111	▩ 127	143	159	175	191	207	223	239	255

Microsoft Publishing Symbol Set

NUL 0	16	32	48	2 64	80	‘ 96	112	128	144	160	° 176	192	208	Ω 224	240
1	17	1 33	49	65	81	97	113	129	145	′ 161	● 177	` 193	` 209	225	241
2	18	” 34	50	66	Ŗ 82	98	114	130	146	″ 162	● 178	´ 194	´ 210	226	242
3	19	3 35	51	67	Š 83	℅ 99	š 115	131	147	^ 163	● 179	^ 195	^ 211	227	243
4	20	4 36	52	68	™ 84	100	Thin Space 116	132	148	~ 164	○ 180	~ 196	~ 212	228	244
5	21	5 37	53	69	85	101	117	133	149	165	○ 181	¯ 197	¯ 213	229	1 245
6	22	7 38	54	70	86	102	118	134	150	166	◯ 182	˘ 198	˘ 214	IJ 230	ij 246
BEL 7	23	’ 39	55	71	87	103	119	135	151	167	■ 183	˙ 199	˙ 215	Ŀ 231	ŀ 247
BS 8	24	9 40	56	72	88	104	120	136	152	168	■ 184	¨ 200	¨ 216	Ł 232	ł 248
HT 9	25	0 41	57	73	Ÿ 89	105	121	137	153	fi 169	■ 185	201	217	233	249
LF 10	26	8 42	58	74	Ž 90	106	ž 122	138	154	fl 170	□ 186	° 202	° 218	234	250
VT 11	ESC 27	† 43	59	75	91	107	123	139	155	ff 171	□ 187	¸ 203	¸ 219	235	251
FF 12	28	, 44	” 60	76	92	ℓ 108	124	140	156	ffi 172	□ 188	204	220	236	252
CR 13	29	— 45	‡ 61	— 77	93	Em Space 109	125	141	157	ffl 173	‰ 189	˝ 205	˝ 221	237	253
SO 14	30	… 46	62	– 78	6 94	En Space 110	“ 126	142	Pt 158	‹ 174	◆ 190	˛ 206	˛ 222	238	254
SI 15	31	/ 47	63	Œ 79	= 95	œ 111	127	143	*f* 159	› 175	◇ 191	ˇ 207	ˇ 223	’n 239	255

Windows Symbol Set

NUL 0	 16	 32	0 48	@ 64	P 80	` 96	p 112	 128	 144	 160	° 176	À 192	Ð 208	à 224	ð 240
 1	 17	! 33	1 49	A 65	Q 81	a 97	q 113	 129	‘ 145	¡ 161	± 177	Á 193	Ñ 209	á 225	ñ 241
 2	 18	" 34	2 50	B 66	R 82	b 98	r 114	 130	’ 146	¢ 162	2 178	Â 194	Ò 210	â 226	ò 242
 3	 19	# 35	3 51	C 67	S 83	c 99	s 115	 131	 147	£ 163	3 179	Ã 195	Ó 211	ã 227	ó 243
 4	 20	$ 36	4 52	D 68	T 84	d 100	t 116	 132	 148	¤ 164	´ 180	Ä 196	Ô 212	ä 228	ô 244
 5	 21	% 37	5 53	E 69	U 85	e 101	u 117	 133	 149	¥ 165	µ 181	Å 197	Õ 213	å 229	õ 245
 6	 22	& 38	6 54	F 70	V 86	f 102	v 118	 134	 150	¦ 166	¶ 182	Æ 198	Ö 214	æ 230	ö 246
BEL 7	 23	' 39	7 55	G 71	W 87	g 103	w 119	 135	 151	§ 167	· 183	Ç 199	× 215	ç 231	÷ 247
BS 8	 24	(40	8 56	H 72	X 88	h 104	x 120	 136	 152	¨ 168	¸ 184	È 200	Ø 216	è 232	ø 248
HT 9	 25	) 41	9 57	I 73	Y 89	i 105	y 121	 137	 153	© 169	1 185	É 201	Ù 217	é 233	ù 249
LF 10	 26	* 42	: 58	J 74	Z 90	j 106	z 122	 138	 154	a 170	o 186	Ê 202	Ú 218	ê 234	ú 250
VT 11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	 139	 155	« 171	» 187	Ë 203	Û 219	ë 235	û 251
FF 12	 28	, 44	< 60	L 76	\ 92	l 108	\| 124	 140	 156	¬ 172	¼ 188	Ì 204	Ü 220	ì 236	ü 252
CR 13	 29	- 45	= 61	M 77	] 93	m 109	} 125	 141	 157	- 173	½ 189	Í 205	Ý 221	í 237	ý 253
SO 14	 30	. 46	> 62	N 78	^ 94	n 110	~ 126	 142	 158	® 174	¾ 190	Î 206	Þ 222	î 238	þ 254
SI 15	 31	/ 47	? 63	O 79	_ 95	o 111	 127	 143	 159	¯ 175	¿ 191	Ï 207	ß 223	ï 239	ÿ 255

DeskTop Symbol Set

NUL 0	DLE 16	 32	0 48	@ 64	P 80	‘ 96	p 112	 128	 144	 160	“ 176	— 192	‹ 208	a 224	´ 240
SOH 1	DC1 17	! 33	1 49	A 65	Q 81	a 97	q 113	 129	 145	¶ 161	” 177	± 193	› 209	o 225	ˋ 241
STX 2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	 130	 146	§ 162	µ 178	× 194	« 210	æ 226	ˆ 242
ETX 3	DC3 19	# 35	3 51	C 67	S 83	c 99	s 115	 131	 147	† 163	‰ 179	÷ 195	» 211	Æ 227	¨ 243
EOT 4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	 132	 148	‡ 164	• 180	° 196	, 212	ð 228	˜ 244
ENQ 5	NAK 21	% 37	5 53	E 69	U 85	e 101	u 117	 133	 149	© 165	● 181	′ 197	„ 213	Ð 229	ˇ 245
ACK 6	SYN 22	& 38	6 54	F 70	V 86	f 102	v 118	 134	 150	® 166	○ 182	″ 198	· 214	ij 230	˘ 246
BEL 7	ETB 23	’ 39	7 55	G 71	W 87	g 103	w 119	 135	 151	™ 167	○ 183	¼ 199	¡ 215	IJ 231	˝ 247
BS 8	CAN 24	(40	8 56	H 72	X 88	h 104	x 120	 136	 152	℅ 168	■ 184	½ 200	¿ 216	ł 232	° 248
HT 9	EM 25	) 41	9 57	I 73	Y 89	i 105	y 121	 137	 153	ç 169	■ 185	¾ 201	Pt 217	Ł 233	· 249
LF 10	SUB 26	* 42	: 58	J 74	Z 90	j 106	z 122	 138	 154	– 170	□ 186	1 202	ℓ 218	œ 234	¯ 250
VT 11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	 139	 155	— 171	□ 187	2 203	£ 219	Œ 235	¸ 251
FF 12	FS 28	, 44	< 60	L 76	\ 92	l 108	\| 124	 140	 156	… 172	' 188	3 204	¥ 220	ø 236	˛ 252
CR 13	GS 29	- 45	= 61	M 77	] 93	m 109	} 125	 141	 157	fi 173	¬ 189	/ 205	¤ 221	Ø 237	˙ 253
SO 14	RS 30	. 46	> 62	N 78	^ 94	n 110	~ 126	 142	 158	fl 174	¦ 190	 206	*f* 222	þ 238	ı 254
SI 15	US 31	/ 47	? 63	O 79	_ 95	o 111	 127	 143	 159	 175	= 191	 207	ß 223	Þ 239	 255

ISO Substitution Table

This table provides a quick reference for the values of special characters contained in ISO (International Standards Organization) symbol sets. ISO symbol sets contain the same characters and the ASCII symbol set, except for the character positions listed in this table. For example, within the ISO 4 (United Kingdom) symbol set, the British pound sign (£) replaces the # sign used in decimal position 35 of the ASCII symbol set.

Decimal Character Equivalents

ISO	Name	ID	35	36	64	91	92	93	94	96	123	124	125	126
6	ASCII	0U	#	$	@	[	\	]	^	‘	{	\|	}	~
2	ISO IRV	2U	#	¤	@	[	\	]	ˆ	`	{	\|	}	—
4	ISO United Kingdom	1E	£	$	@	[	\	]	ˆ	`	{	\|	}	—
25	ISO French	0F	£	$	à	°	ç	§	ˆ	`	é	ù	è	¨
69	ISO French	1F	£	$	à	°	ç	§	ˆ	µ	é	ù	è	¨
	HP German	0G	£	$	§	Ä	Ö	Ü	ˆ	`	ä	ö	ü	ß
21	ISO German	1G	#	$	§	Ä	Ö	Ü	ˆ	`	ä	ö	ü	ß
15	ISO Italian	0I	£	$	§	°	ç	é	ˆ	ù	à	ò	è	ì
14	JIS ASCII	0K	#	$	@	[	¥	]	ˆ	`	{	\|	}	—
57	ISO Chinese	2K	#	¥	@	[	\	]	ˆ	`	{	\|	}	—
10	ISO Swedish	3S	#	¤	@	Ä	Ö	Å	ˆ	`	ä	ö	å	—
11	ISO Swedish:	0S	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
	HP Spanish	1S	#	$	@	¡	Ñ	¿	°	`	{	ñ	}	~
17	ISO Spanish	2S	£	$	§	¡	Ñ	¿	ˆ	`	°	ñ	ç	~
85	ISO Spanish:	6S	#	$	·	¡	Ñ	Ç	¿	`	´	ñ	ç	¨
16	ISO Portuguese	4S	#	$	§	Ã	Ç	Õ	ˆ	`	ã	ç	õ	°
84	ISO Portuguese:	5S	#	$	´	Ã	Ç	Õ	ˆ	`	ã	ç	õ	~
60	ISO Norwegian v1	0D	#	$	@	Æ	Ø	Å	ˆ	`	æ	ø	å	—
61	ISO Norwegian v2	1D	§	$	@	Æ	Ø	Å	ˆ	`	æ	ø	å	\|

Control Codes

Backspace	$^{B}_{S}$	Move one column left unless at left margin in which case no action is taken.
Line Feed	$^{L}_{F}$	Move to next print line while maintaining current column position.
Form Feed	$^{F}_{F}$	Move to first line at top of the next page while maintaining current column position.
Carriage Return	$^{C}_{R}$	Move to the left margin on current print line.
Shift Out	$^{S}_{O}$	Select characters that follow from the current secondary font until receipt of a Shift In.
Shift In	$^{S}_{I}$	Select characters that follow from the current primary font until receipt of a Shift Out.
Escape	$^{E}_{C}$	Indicates the beginning of a special control sequence (escape sequence).
Horizontal Tab	$^{H}_{T}$	Move to next horizontal tab stop. The tab stops are at the left margin and at every eight columns to the right of the left margin.
Space	$^{S}_{P}$	Move one column to the right unless at right margin in which case no action is taken.

Conversion Table

Table A-1 gives the hexadecimal, decimal, and octal equivalent of each character in the Roman-8 symbol set (see page A-2). Use this table when your software requires you to enter hexadecimal, decimal, or octal values in place of your printer command characters.

Table A-1. Roman-8 Character Conversion Table

Graphic	Hex	Dec	Oct	Description
	00	0	000	NUL (null)
	01	1	001	SOH (start of heading)
	02	2	002	STX (start of text)
	03	3	003	ETX (end of text)
	04	4	004	EOT (end of transmission)
	05	5	005	ENQ (enquiry)
	06	6	006	ACK (acknowledge)
	07	7	007	BEL (bell)
	08	8	010	BS (backspace)
	09	9	011	HT (horizontal tabulation)
	0A	10	012	LF (line feed)
	0B	11	013	VT (vertical tabulation)
	0C	12	014	FF (form feed)
	0D	13	015	CR (carriage return)
	0E	14	016	SO (shift out)
	0F	15	017	SI (shift in)
	10	16	020	DLE (data link escape)
	11	17	021	DC1 (device control 1 or X-ON)
	12	18	022	DC2 (device control 2)
	13	19	023	DC3 (device control 3 or X-OFF)
	14	20	024	DC4 (device control 4)
	15	21	025	NAK (negative acknowledge)
	16	22	026	SYN (synchronous idle)
	17	23	027	ETB (end of transmission block)
	18	24	030	CAN (cancel)
	19	25	031	EM (end of medium)
	1A	26	032	SUB (substitute)
	1B	27	033	ESC (escape)
	1C	28	034	FS (file separator)
	1D	29	035	GS (group separator)
	1E	30	036	RS (record separator)
	1F	31	037	US (unit separator)
	20	32	040	SP (space)
!	21	33	041	Exclamation point
"	22	34	042	Quotation mark
#	23	35	043	Number sign
$	24	36	044	Dollar sign
%	25	37	045	Percent sign
&	26	38	046	Ampersand
'	27	39	047	Closing single quote (apostrophe)

Table A-1. Roman-8 Character Conversion Table (continued)

Graphic	Hex	Dec	Oct	Description
(	28	40	050	Opening parenthesis
)	29	41	051	Closing parenthesis
*	2A	42	052	Asterisk
+	2B	43	053	Plus
,	2C	44	054	Comma
-	2D	45	055	Hyphen
.	2E	46	056	Period (point)
/	2F	47	057	Slant (solidus)
0	30	48	060	Zero
1	31	49	061	One
2	32	50	062	Two
3	33	51	063	Three
4	34	52	064	Four
5	35	53	065	Five
6	36	54	066	Six
7	37	55	067	Seven
8	38	56	070	Eight
9	39	57	071	Nine
:	3A	58	072	Colon
;	3B	59	073	Semicolon
<	3C	60	074	Less than sign
=	3D	61	075	Equals sign
>	3E	62	076	Greater than sign
?	3F	63	077	Question mark
@	40	64	100	Commercial At
A	41	65	101	Uppercase A
B	42	66	102	Uppercase B
C	43	67	103	Uppercase C
D	44	68	104	Uppercase D
E	45	69	105	Uppercase E
F	46	70	106	Uppercase F
G	47	71	107	Uppercase G
H	48	72	110	Uppercase H
I	49	73	111	Uppercase I
J	4A	74	112	Uppercase J
K	4B	75	113	Uppercase K
L	4C	76	114	Uppercase L
M	4D	77	115	Uppercase M
N	4E	78	116	Uppercase N
O	4F	79	117	Uppercase O

Table A-1. Roman-8 Character Conversion Table (continued)

Graphic	Hex	Dec	Oct	Description
P	50	80	120	Uppercase P
Q	51	81	121	Uppercase Q
R	52	82	122	Uppercase R
S	53	83	123	Uppercase S
T	54	84	124	Uppercase T
U	55	85	125	Uppercase U
V	56	86	126	Uppercase V
W	57	87	127	Uppercase W
X	58	88	130	Uppercase X
Y	59	89	131	Uppercase Y
Z	5A	90	132	Uppercase Z
[	5B	91	133	Opening square bracket
\	5C	92	134	Reverse slant
]	5D	93	135	Closing bracket
^	5E	94	136	Caret (circumflex)
_	5F	95	137	Underscore (low line)
`	60	96	140	Opening Single Quote
a	61	97	141	Lowercase a
b	62	98	142	Lowercase b
c	63	99	143	Lowercase c
d	64	100	144	Lowercase d
e	65	101	145	Lowercase e
f	66	102	146	Lowercase f
g	67	103	147	Lowercase g
h	68	104	150	Lowercase h
i	69	105	151	Lowercase i
j	6A	106	152	Lowercase j
k	6B	107	153	Lowercase k
l	6C	108	154	Lowercase l
m	6D	109	155	Lowercase m
n	6E	110	156	Lowercase n
o	6F	111	157	Lowercase o
p	70	112	160	Lowercase p
q	71	113	161	Lowercase q
r	72	114	162	Lowercase r
s	73	115	163	Lowercase s
t	74	116	164	Lowercase t
u	75	117	165	Lowercase u
v	76	118	166	Lowercase v
w	77	119	167	Lowercase w

Table A-1. Roman-8 Character Conversion Table (continued)

Graphic	Hex	Dec	Oct	Description
x	78	120	170	Lowercase x
y	79	121	171	Lowercase y
z	7A	122	172	Lowercase z
{	7B	123	173	Opening brace (curly bracket)
\|	7C	124	174	Vertical line
}	7D	125	175	Closing brace (curly bracket)
~	7E	126	176	Approximate (tilde)
▒	7F	127	177	DEL (delete, rubout)
	80	128	200	--undefined control code--
	81	129	201	--undefined control code--
	82	130	202	--undefined control code--
	83	131	203	--undefined control code--
	84	132	204	--undefined control code--
	85	133	205	--undefined control code--
	86	134	206	--undefined control code--
	87	135	207	--undefined control code--
	88	136	210	--undefined control code--
	89	137	211	--undefined control code--
	8A	138	212	--undefined control code--
	8B	139	213	--undefined control code--
	8C	140	214	--undefined control code--
	8D	141	215	--undefined control code--
	8E	142	216	--undefined control code--
	8F	143	217	--undefined control code--
	90	144	220	--undefined control code--
	91	145	221	--undefined control code--
	92	146	222	--undefined control code--
	93	147	223	--undefined control code--
	94	148	224	--undefined control code--
	95	149	225	--undefined control code--
	96	150	226	--undefined control code--
	97	151	227	--undefined control code--
	98	152	230	--undefined control code--
	99	153	231	--undefined control code--
	9A	154	232	--undefined control code--
	9B	155	233	--undefined control code--
	9C	156	234	--undefined control code--
	9D	157	235	--undefined control code--
	9E	158	236	--undefined control code--
	9F	159	237	--undefined control code--

Table A-1. Roman-8 Character Conversion Table (continued)

Graphic	Hex	Dec	Oct	Description
	A0	160	240	--undefined--
À	A1	161	241	Uppercase A grave
Â	A2	162	242	Uppercase A circumflex
È	A3	163	243	Uppercase E grave
Ê	A4	164	244	Uppercase E circumflex
Ë	A5	165	245	Uppercase E dieresis
Î	A6	166	246	Uppercase I circumflex
Ï	A7	167	247	Uppercase I dieresis
´	A8	168	250	Lowercase acute accent
`	A9	169	251	Lowercase grave accent
^	AA	170	252	Lowercase circumflex accent
¨	AB	171	253	Lowercase dieresis accent
~	AC	172	254	Lowercase tilde accent
Ù	AD	173	255	Uppercase U grave
Û	AE	174	256	Uppercase U circumflex
£	AF	175	257	Italian lira (pound sterling)
¯	B0	176	260	Overscore (high line)
Ý	B1	177	261	Uppercase Y acute
ý	B2	178	262	Lowercase y acute
°	B3	179	263	Degree
Ç	B4	180	264	Uppercase C cedilla
ç	B5	181	265	Lowercase c cedilla
Ñ	B6	182	266	Uppercase N tilde
ñ	B7	183	267	Lowercase n tilde
¡	B8	184	270	Inverted exlamation mark
¿	B9	185	271	Inverted question mark
¤	BA	186	272	General currency symbol
£	BB	187	273	Pound sterling sign
¥	BC	188	274	Yen sign
§	BD	189	275	Section mark
f	BE	190	276	Dutch guilder symbol
¢	BF	191	277	Cent sign
â	C0	192	300	Lowercase a circumflex
ê	C1	193	301	Lowercase e circumflex
ô	C2	194	302	Lowercase o circumflex
û	C3	195	303	Lowercase u circumflex
á	C4	196	304	Lowercase a acute
é	C5	197	305	Lowercase e acute
ó	C6	198	306	Lowercase o acute
ú	C7	199	307	Lowercase u acute

Table A-1. Roman-8 Character Conversion Table (continued)

Graphic	Hex	Dec	Oct	Description
à	C8	200	310	Lowercase a grave
è	C9	201	311	Lowercase e grave
ò	CA	202	312	Lowercase o grave
ù	CB	203	313	Lowercase u grave
ä	CC	204	314	Lowercase a dieresis
ë	CD	205	315	Lowercase e dieresis
ö	CE	206	316	Lowercase o dieresis
ü	CF	207	317	Lowercase u dieresis
Å	D0	208	320	Uppercase A bolle
î	D1	209	321	Lowercase i circumflex
Ø	D2	210	322	Uppercase O oblique
Æ	D3	211	323	Uppercase AE diphthong
å	D4	212	324	Lowercase a bolle
í	D5	213	325	Lowercase i acute
ø	D6	214	326	Lowercase o oblique
æ	D7	215	327	Lowercase ae diphthong
Ä	D8	216	330	Uppercase A dieresis
ì	D9	217	331	Lowercase i grave
Ö	DA	218	332	Uppercase O dieresis
Ü	DB	219	333	Uppercase U dieresis
É	DC	220	334	Uppercase E acute
ï	DD	221	335	Lowercase i dieresis
ß	DE	222	336	Lowercase es-zet ligature
Ô	DF	223	337	Uppercase O circumflex
Á	E0	224	340	Uppercase A acute
Ã	E1	225	341	Uppercase A tilde
ã	E2	226	342	Lowercase a tilde
Ð	E3	227	343	Uppercase Eth
ð	E4	228	344	Lowercase eth Icelandic
Í	E5	229	345	Uppercase I acute
Ì	E6	230	346	Uppercase I grave
Ó	E7	231	347	Uppercase O acute
Ò	E8	232	350	Uppercase O grave
Õ	E9	233	351	Uppercase O tilde
õ	EA	234	352	Lowercase o tilde
Š	EB	235	353	Uppercase S hacek
š	EC	236	354	Lowercase s hacek
Ú	ED	237	355	Uppercase U acute
Ÿ	EE	238	356	Uppercase Y dieresis
ÿ	EF	239	357	Lowercase y dieresis

Table A-1. Roman-8 Character Conversion Table (continued)

Graphic	Hex	Dec	Oct	Description
Þ	F0	240	360	Uppercase Thorn
þ	F1	241	361	Lowercase thorn
·	F2	242	362	Lowercase Catalan middle dot
µ	F3	243	363	Lowercase mu (micro)
¶	F4	244	364	Pilcrow (paragraph sign)
¾	F5	245	365	Vulgar fraction: three fourths
–	F6	246	366	Minus sign
¼	F7	247	367	Vulgar fraction: one fourth
½	F8	248	370	Vulgar fraction: one half
ª	F9	249	371	Female ordinal
º	FA	250	372	Male ordinal
«	FB	251	373	Left pointing guillemets (quotes)
■	FC	252	374	Medium solid box
»	FD	253	375	Right pointing guillemets (quotes)
±	FE	254	376	Plus over minus
	FF	255	377	--undefined--

B

Printer Commands

This appendix lists the LaserJet III printer commands. Table B-1 lists the PCL context printer commands in hierarchical order and gives the decimal and hexadecimal equivalents of each. Table B-2 lists the HP-GL context printer commands.

Refer to the *LaserJet III Printer Technical Reference Manual* for detailed explanations of these commands and their use.

Table B-1. LaserJet III Printer Commands — PCL Context

FUNCTION	PARAMETER	COMMAND	DECIMAL VALUE	HEXADECIMAL VALUE
JOB CONTROL COMMANDS				
RESET				
RESET	—	EcE	027 069	1B 45
NUMBER OF COPIES	# of Copies (1-99)	Ec&/#X (x)	027 038 108 #...# 088 (120)	1B 26 6C #...# 58 (78)
LONG-EDGE (LEFT) OFFSET REGISTRATION	# of Decipoints (1/720")	Ec&/#U (u)	027 038 108 #...# 085 (117)	1B 26 6C #...# 55 (75)
SHORT-EDGE (TOP) OFFSET REGISTRATION	# of Decipoints (1/720")	Ec&/#Z (z)	027 038 108 #...# 090 (122)	1B 26 6C #...# 5A (7A)
PAGE CONTROL COMMANDS				
PAGE LENGTH and SIZE				
PAPER SOURCE	Eject Page	Ec&/0H (h)	027 038 108 048 072 (104)	1B 26 6C 30 48 (68)
	Paper Tray Auto Feed	Ec&/1H (h)	027 038 108 049 072 (104)	1B 26 6C 31 48 (68)
	Manual Feed	Ec&/2H (h)	027 038 108 050 072 (104)	1B 26 6C 32 48 (68)
	Manual Envelope Feed	Ec&/3H (h)	027 038 108 051 072 (104)	1B 26 6C 33 48 (68)
PAGE SIZE	Executive	Ec&/1A (a)	027 038 108 049 065 (97)	1B 26 6C 31 41 (61)
	Letter	Ec&/2A (a)	027 038 108 050 065 (97)	1B 26 6C 32 41 (61)
	Legal	Ec&/3A (a)	027 038 108 051 065 (97)	1B 26 6C 33 41 (61)
	A4	Ec&/26A (a)	027 038 108 050 054 065 (97)	1B 26 6C 32 36 41 (61)
(Envelopes)	Monarch	Ec&/80A (a)	027 038 108 056 048 065 (97)	1B 26 6C 38 30 41 (61)
	COM 10	Ec&/81A (a)	027 038 108 056 049 065 (97)	1B 26 6C 38 31 41 (61)
	DL	Ec&/90A (a)	027 038 108 057 048 065 (97)	1B 26 6C 39 30 41 (61)
	C5	Ec&/91A (a)	027 038 108 057 049 065 (97)	1B 26 6C 39 31 41 (61)
PAGE LENGTH	# of Lines	Ec&/#P (p)	027 038 108 #...# 080 (112)	1B 26 6C #...# 50 (70)
ORIENTATION				
ORIENTATION	Portrait	Ec&/0O (o)	027 038 108 048 079 (111)	1B 26 6C 30 4F (6F)
	Landscape	Ec&/1O (o)	027 038 108 049 079 (111)	1B 26 6C 31 4F (6F)
	Reverse Portrait	Ec&/2O (o)	027 038 108 050 079 (111)	1B 26 6C 32 4F (6F)
	Reverse Landscape	Ec&/3O (o)	027 038 108 051 079 (111)	1B 26 6C 33 4F (6F)
PRINT DIRECTION	# Degrees of Rotation (counterclockwise, 90° increments only)	Ec&a#P	027 038 097 #...# 080 (112)	1B 26 61 #...# 50 (70)

Values in the parentheses identify the lower case of the termination character. This value is used if the printer command is combined.

Table B-1. LaserJet III Printer Commands — PCL Context (continued)

FUNCTION	PARAMETER	COMMAND	DECIMAL VALUE	HEXADECIMAL VALUE
MARGINS and TEXT LENGTH				
TOP MARGIN	# of Lines	Ec&/#E *(e)*	027 038 108 #...# 069 *(101)*	1B 26 6C #...# 45 *(65)*
TEXT LENGTH	# of Lines	Ec&/#F *(f)*	027 038 108 #...# 070 *(102)*	1B 26 6C #...# 46 *(66)*
LEFT MARGIN	# of Columns	Ec&a#L *(l)*	027 038 097 #...# 076 *(108)*	1B 26 61 #...# 4C *(6C)*
RIGHT MARGIN	# of Columns	Ec&a#M *(m)*	027 038 097 #...# 077 *(109)*	1B 26 61 #...# 4D *(6D)*
CLEAR HORIZONTAL MARGINS	—	Ec9	027 057	1B 39
PERFORATION SKIP MODE				
PERFORATION SKIP	Disable	Ec&/0L *(l)*	027 038 108 048 076 *(108)*	1B 26 6C 30 4C *(6C)*
	Enable	Ec&/1L *(l)*	027 038 108 049 076 *(108)*	1B 26 6C 31 4C *(6C)*
HORIZONTAL COLUMN SPACING				
HORIZONTAL MOTION INDEX (HMI)	# of 1/120" Increments	Ec&k#H *(h)*	027 038 107 #...#0 48 072 *(104)*	1B 26 6B #...# 4B *(68)*
VERTICAL LINE SPACING				
VERTICAL MOTION INDEX (VMI)	# of 1/48" Increments	Ec&/#C *(c)*	027 038 108 #...# 048 076 *(99)*	1B 26 6C #...# 43 *(63)*
LINE SPACING (Lines per Inch)	1 line/inch	Ec&/1D *(d)*	027 038 108 049 068 *(100)*	1B 26 6C 31 44 *(64)*
	2 lines/inch	Ec&/2D *(d)*	027 038 108 050 068 *(100)*	1B 26 6C 32 44 *(64)*
	3 lines/inch	Ec&/3D *(d)*	027 038 108 051 068 *(100)*	1B 26 6C 33 44 *(64)*
	4 lines/inch	Ec&/4D *(d)*	027 038 108 052 068 *(100)*	1B 26 6C 34 44 *(64)*
	6 lines/inch	Ec&/6D *(d)*	027 038 108 054 068 *(100)*	1B 26 6C 36 44 *(64)*
	8 lines/inch	Ec&/8D *(d)*	027 038 108 056 068 *(100)*	1B 26 6C 38 44 *(64)*
	12 lines/inch	Ec&/12D *(d)*	027 038 108 049 050 068 *(100)*	1B 26 6C 31 32 44 *(64)*
	16 lines/inch	Ec&/16D *(d)*	027 038 108 049 054 068 *(100)*	1B 26 6C 31 36 44 *(64)*
	24 lines/inch	Ec&/24D *(d)*	027 038 108 050 052 068 *(100)*	1B 26 6C 32 34 44 *(64)*
	48 lines/inch	Ec&/48D *(d)*	027 038 108 052 056 068 *(100)*	1B 26 6C 34 38 44 *(64)*
CURSOR POSITIONING				
VERTICAL and HORIZONTAL				
VERTICAL POSITION	# of Rows	Ec&a#R *(r)*	027 038 097 #...# 082 *(114)*	1B 26 61 #...# 52 *(72)*
	# of Dots	Ec*p#Y *(y)*	027 042 112 #...# 089 *(121)*	1B 2A 70 #...# 59 *(79)*
	# of Decipoints	Ec&a#V *(v)*	027 038 097 #...# 086 *(118)*	1B 26 61 #...# 56 *(76)*
HORIZONTAL POSITION	# of Columns	Ec&a#C *(c)*	027 038 097 #...# 067 *(99)*	1B 26 61 #...# 43 *(63)*
	# of Dots	Ec*p#X *(x)*	027 042 112 #...# 088 *(120)*	1B 2A 70 #...# 58 *(78)*
	# of Decipoints	Ec&a#H *(h)*	027 038 097 #...# 072 *(104)*	1B 26 61 #...# 48 *(68)*
HALF LINE FEED		Ec =	027 061	1B 3D

Values in the parentheses identify the lower case of the termination character. This value is used if the printer command is combined.

Table B-1. LaserJet III Printer Commands — PCL Context (continued)

FUNCTION	PARAMETER	COMMAND	DECIMAL VALUE	HEXADECIMAL VALUE
END-OF-LINE TERMINATION				
LINE TERMINATION	CR=CR; LF=LF; FF=FF	Ec&k0G *(g)*	027 038 107 048 071 *(103)*	1B 26 6B 30 47 *(67)*
	CR=CR+LF; LF=LF; FF=FF	Ec&k1G *(g)*	027 038 107 049 071 *(103)*	1B 26 6B 31 47 *(67)*
	CR=CR; LF=CR+LF; FF=CR+FF	Ec&k2G *(g)*	027 038 107 050 071 *(103)*	1B 26 6B 32 47 *(67)*
	CR=CR+LF; LF=CR+LF; FF=CR+FF	Ec&k3G *(g)*	027 038 107 051 071 *(103)*	1B 26 6B 33 47 *(67)*
PUSH/POP POSITION				
PUSH/POP POSITION	Push	Ec&f0S *(s)*	027 038 102 048 083 *(115)*	1B 26 66 30 53 *(73)*
	Pop	Ec&f1S *(s)*	027 038 102 049 083 *(115)*	1B 26 66 31 53 *(73)*
FONT SELECTION				
SYMBOL SET SELECTION†				
PRIMARY SYMBOL SET	ISO 60: Norwegian 1	Ec(0D *(d)*	027 040 048 068 *(100)*	1B 28 30 44 *(64)*
	*ISO 61: Norwegian 2	Ec(1D *(d)*	027 040 049 068 *(100)*	1B 28 31 44 *(64)*
	ISO 4: United Kingdom	Ec(1E *(e)*	027 040 049 069 *(101)*	1B 28 31 45 *(65)*
	*ISO 25: French (obsolete)	Ec(0F *(f)*	027 040 048 070 *(102)*	1B 28 30 46 *(66)*
	ISO 69: French	Ec(1F *(f)*	027 040 049 070 *(102)*	1B 28 31 46 *(66)*
	*HP German (obsolete)	Ec(0G *(g)*	027 040 048 071 *(103)*	1B 28 30 47 *(67)*
	ISO 21: German	Ec(1G *(g)*	027 040 049 071 *(103)*	1B 28 31 47 *(67)*
	ISO 15: Italian	Ec(0I *(i)*	027 040 048 073 *(105)*	1B 28 30 49 *(69)*
	*ISO 14: JIS ASCII	Ec(0K *(k)*	027 040 048 075 *(107)*	1B 28 30 4B *(6B)*
	*ISO 57: Chinese	Ec(2K *(k)*	027 040 050 075 *(107)*	1B 28 32 4B *(6B)*
	ECMA-94 Latin 1	Ec(0N *(n)*	027 040 048 78 *(110)*	1B 28 30 4E *(6E)*
	ISO 11: Swedish	Ec(0S *(s)*	027 040 048 083 *(115)*	1B 28 30 53 *(73)*
	*HP Spanish (obsolete)	Ec(1S *(s)*	027 040 049 083 *(115)*	1B 28 31 53 *(73)*
	ISO 17: Spanish	Ec(2S *(s)*	027 040 050 083 *(115)*	1B 28 32 53 *(73)*
	*ISO 10: Swedish	Ec(3S *(s)*	027 040 051 083 *(115)*	1B 28 33 53 *(73)*
	*ISO 16: Portuguese	Ec(4S *(s)*	027 040 052 083 *(115)*	1B 28 34 53 *(73)*
	*ISO 84: Portuguese	Ec(5S *(s)*	027 040 053 083 *(115)*	1B 28 35 53 *(73)*
	*ISO 85: Spanish	Ec(6S *(s)*	027 040 054 083 *(115)*	1B 28 36 53 *(73)*
	ISO 6: ASCII	Ec(0U *(u)*	027 040 048 085 *(117)*	1B 28 30 55 *(75)*
	*ISO 2: IRV	Ec(2U *(u)*	027 040 050 085 *(117)*	1B 28 32 55 *(75)*
	Roman8	Ec(8U *(u)*	027 040 056 85 *(117)*	1B 28 38 55 *(75)*
	PC-8	Ec(10U *(u)*	027 040 049 048 085 *(117)*	1B 28 31 30 55 *(75)*
	PC-8 D/N	Ec(11U *(u)*	027 040 049 049 085 *(117)*	1B 28 31 31 55 *(75)*
	PC 850	Ec(12U *(u)*	027 040 049 050 085 *(117)*	1B 28 31 32 55 *(75)*

Values in the parentheses identify the lower case of the termination character. This value is used if the printer command is combined.

†Additional symbol sets are supported. Refer to the LaserJet III Technical Reference Manual.
*These symbol sets are becoming low usage sets and are not recommended for future use.

The primary font printer commands in this table can be specified as secondary by replacing the left parenthesis "(" in the command with a right parenthesis ")."

Table B-1. LaserJet III Printer Commands — PCL Context (continued)

FUNCTION	PARAMETER	COMMAND	DECIMAL VALUE	HEXADECIMAL VALUE
SPACING				
PRIMARY SPACING	Proportional	Ec(s1P *(p)*	027 040 115 049 080 *(112)*	1B 28 73 31 50 *(70)*
	Fixed	Ec(s0P *(p)*	027 040 115 048 080 *(112)*	1B 28 73 30 50 *(70)*
PITCH				
PRIMARY PITCH	# Characters / inch	Ec(s#H *(h)*	027 040 115 #...# 072 *(104)*	1B 28 73 #...# 48 *(68)*
SET PITCH MODE	10.0	Ec&k0S *(s)*	027 038 107 048 083 *(115)*	1B 26 6B 30 53 *(73)*
	Compressed (16.5-16.7)	Ec&k2S *(s)*	027 038 107 050 083 *(115)*	1B 26 6B 32 53 *(73)*
	Elite (12.0)	Ec&k4S *(s)*	027 038 107 052 083 *(115)*	1B 26 6B 34 53 *(73)*
POINT SIZE				
PRIMARY HEIGHT	# Points	Ec(s#V *(v)*	027 040 115 #...# 086 *(118)*	1B 28 73 #...# 56 *(76)*
STYLE				
PRIMARY STYLE	Upright	Ec(s0S *(s)*	027 040 115 048 083 *(115)*	1B 28 73 30 53 *(73)*
	Italic	Ec(s1S *(s)*	027 040 115 049 083 *(115)*	1B 28 73 31 53 *(73)*
The LaserJet III printer allows you to specify complex structures (contours, outlines, shading, etc.) and widths as well as posture. Refer to the LaserJet III Technical Reference Manual.				
STROKE WEIGHT				
PRIMARY FONT STROKE WEIGHT	Ultra Thin	Ec(s-7B	027 040 115 -055 066 *(98)*	1B 28 73 -37 42 *(62)*
	Extra Thin	Ec(s-6B	027 040 115 -054 066 *(98)*	1B 28 73 -36 42 *(62)*
	Thin	Ec(s-5B	027 040 115 -053 066 *(98)*	1B 28 73 -35 42 *(62)*
	Extra Light	Ec(s-4B	027 040 115 -052 066 *(98)*	1B 28 73 -34 42 *(62)*
	Light	Ec(s-3B	027 040 115 -051 066 *(98)*	1B 28 73 -33 42 *(62)*
	Demi Light	Ec(s-2B	027 040 115 -050 066 *(98)*	1B 28 73 -32 42 *(62)*
	Semi Light	Ec(s-1B	027 040 115 -049 066 *(98)*	1B 28 73 -31 42 *(62)*
	Medium (normal)	Ec(s0B	027 040 115 048 066 *(98)*	1B 28 73 30 42 *(62)*
	Semi Bold	Ec(s1B	027 040 115 049 066 *(98)*	1B 28 73 31 42 *(62)*
	Demi Bold	Ec(s2B	027 040 115 050 066 *(98)*	1B 28 73 32 42 *(62)*
	Bold	Ec(s3B	027 040 115 051 066 *(98)*	1B 28 73 33 42 *(62)*
	Extra Bold	Ec(s4B	027 040 115 052 066 *(98)*	1B 28 73 34 42 *(62)*
	Black	Ec(s5B	027 040 115 053 066 *(98)*	1B 28 73 35 42 *(62)*
	Extra Black	Ec(s6B	027 040 115 054 066 *(98)*	1B 28 73 36 42 *(62)*
	Ultra Black	Ec(s7B	027 040 115 055 066 *(98)*	1B 28 73 37 42 *(62)*
PRIMARY TYPEFACE				
TYPEFACE	Courier	Ec(s3T *(t)*	027 040 115 051 084 *(116)*	1B 28 73 33 54 *(74)*
	Univers	Ec(s4148T *(t)*	027 040 115 052 084 *(116)*	1B 28 73 34 54 *(74)*
	LinePrinter	Ec(s0T *(t)*	027 040 115 048 084 *(116)*	1B 28 73 30 54 *(74)*
	CG Times	Ec(s4101T *(t)*	027 040 115 053 084 *(116)*	1B 28 73 35 54 *(74)*
Many more typefaces are supported. Refer to the LaserJet III Technical Reference Manual.				

Values in the parentheses identify the lower case of the termination character. This value is used if the printer command is combined.

The primary font printer commands in this table can be specified as secondary by replacing the left parenthesis "(" in the command with a right parenthesis ")".

Table B-1. LaserJet III Printer Commands — PCL Context (continued)

FUNCTION	PARAMETER	COMMAND	DECIMAL VALUE	HEXADECIMAL VALUE
FONT DEFAULT				
FONT DEFAULT	Primary Font Secondary Font	Ec(3@ Ec)3@	027 040 051 064 027 041 051 064	1B 28 33 40 1B 29 33 40
UNDERLINE				
UNDERLINE	Enable Fixed Enable Floating Disable	Ec&d0D *(d)* Ec&d3D *(d)* Ec&d@	027 038 100 048 068 *(100)* 027 038 100 051 068 *(100)* 027 038 100 064	1B 26 64 30 44 *(64)* 1B 26 64 33 44 *(64)* 1B 26 64 40
TRANSPARENT PRINT				
TRANSPARENT PRINT DATA	# of Bytes	Ec&p#X[Data]	027 038 112 #...# 088	1B 26 70 #...# 58
FONT MANAGEMENT				
ASSIGN FONT ID	Font ID #	Ec*c#D *(d)*	027 042 099 #...# 068 *(100)*	1B 2A 63 #...# 44 *(64)*
FONT AND CHARACTER CONTROL	Delete all Fonts	Ec*c0F *(f)*	027 042 099 048 070 *(102)*	1B 2A 63 30 46 *(66)*
	Delete all Temporary Fonts	Ec*c1F *(f)*	027 042 099 049 070 *(102)*	1B 2A 63 31 46 *(66)*
	Delete Last Font ID Specified	Ec*c2F *(f)*	027 042 099 050 070 *(102)*	1B 2A 63 32 46 *(66)*
	Delete Last Character Specified	Ec*c3F *(f)*	027 042 099 051 070 *(102)*	1B 2A 63 33 46 *(66)*
	Make Font Temporary	Ec*c4F *(f)*	027 042 099 052 070 *(102)*	1B 2A 63 34 46 *(66)*
	Make Font Permanent	Ec*c5F *(f)*	027 042 099 053 070 *(102)*	1B 2A 63 35 46 *(66)*
	Copy / Assign the Currently Invoked Font as Temporary	Ec*c6F *(f)*	027 042 099 054 070 *(102)*	1B 2A 63 36 46 *(66)*
FONT SELECTION BY ID NUMBER				
SELECT FONT (with ID #)	ID # Primary Font ID # Secondary Font	Ec(#X *(x)* Ec)#X *(x)*	027 040 #...# 088 *(120)* 027 041 #...# 088 *(120)*	1B 28 #...# 58 *(78)* 1B 29 #...# 58 *(78)*
SOFT FONT CREATION				
FONT DESCRIPTOR (FONT HEADER)	# of Bytes	Ec)s#W[Data]	027 041 115 #...# 087	1B 29 73 #...# 57
DOWNLOAD CHARACTER	# of Bytes	Ec(s#W[Data]	027 040 115 #...# 087	1B 28 73 #...# 57
CHARACTER CODE	Character Code # (decimal)	Ec*c#E *(e)*	027 042 099 #...# 069 *(101)*	1B 2A 63 #...# 45 *(65)*

Values in the parentheses identify the lower case of the termination character. This value is used if the printer command is combined.

Table B-1. LaserJet III Printer Commands — PCL Context (continued)

FUNCTION	PARAMETER	COMMAND	DECIMAL VALUE	HEXADECIMAL VALUE
GRAPHICS				
VECTOR GRAPHICS				
ENTER HP-GL/2 MODE	Use Previous HP-GL/2 Pen Position	Ec%0B	027 037 048 066 *(98)*	1B 25 30 42 *(62)*
	Use Current PCL CAP	Ec%1B	027 037 049 066 *(98)*	1B 25 31 42 *(62)*
HP-GL/2 PLOT HORIZONTAL SIZE	Horizontal Size in Inches	Ec*c#K	027 042 099 #...# 075 *(107)*	1B 2A 63 #...# 4B *(6B)*
HP-GL/2 PLOT VERTICAL SIZE	Vertical Size in Inches	Ec*c#L	027 042 099 #...# 076 *(108)*	1B 2A 63 #...# 4C *(6C)*
SET PICTURE FRAME ANCHOR POINT	Set Anchor Point to CAP	Ec*c0T	027 042 099 048 084 *(116)*	1B 2A 63 30 54 *(74)*
PICTURE FRAME HORIZONTAL SIZE	Decipoints	Ec*c#X	027 042 99 #...# 088 *(120)*	1B 2A 63 #...# 58 *(78)*
PICTURE FRAME VERTICAL SIZE	Decipoints	Ec*c#Y	027 042 99 #...# 089 *(121)*	1B 2A 63 #...# 59 *(79)*
RASTER GRAPHICS				
RASTER RESOLUTION	75 Dots/inch	Ec*t75R *(r)*	027 042 116 055 053 082 *(114)*	1B 2A 74 37 35 52 *(72)*
	100 Dots/inch	Ec*t100R *(r)*	027 042 116 049 048 048 082 *(114)*	1B 2A 74 31 30 30 52 *(72)*
	150 Dots/inch	Ec*t150R *(r)*	027 042 116 049 053 048 082 *(114)*	1B 2A 74 31 35 30 52 *(72)*
	300 Dots/inch	Ec*t300R *(r)*	027 042 116 051 048 048 082 *(114)*	1B 2A 74 33 30 30 52 *(72)*

Values in the parentheses identify the lower case of the termination character. This value is used if the printer command is combined.

Table B-1. LaserJet III Printer Commands — PCL Context (continued)

FUNCTION	PARAMETER	COMMAND	DECIMAL VALUE	HEXADECIMAL VALUE
RASTER GRAPHICS PRESENTATION				
RASTER GRAPHICS PRESENTATION	Rotate Image	Ec*r0F (f)	027 042 114 048 070 (102)	1B 2A 72 30 46 (66)
	LaserJet Landscape Compatible	Ec*r3F (f)	027 042 114 051 070 (102)	1B 2A 72 33 46 (66)
START RASTER GRAPHICS	Left Raster Graphics Margin	Ec*r0A (a)	027 042 114 048 065 (97)	1B 2A 72 30 41 (61)
	Current Cursor	Ec*r1A (a)	027 042 114 049 065 (97)	1B 2A 72 31 41 (61)
RASTER Y OFFSET	# of Raster Lines of Vertical Movement	Ec*b#Y (y)	027 042 098 #...# 089 (120)	1B 2A 62 #...# 59 (79)
SET RASTER COMPRESSION MODE	Uncoded	Ec*b0M (m)	027 042 098 048 077 (109)	1B 2A 62 30 41 (6D)
	Run-Length Encoded	Ec*b1M (m)	027 042 098 049 077 (109)	1B 2A 62 31 41 (6D)
	Tagged Image File Format	Ec*b2M (m)	027 042 098 050 077 (109)	1B 2A 62 32 41 (6D)
	Delta Row	Ec*b3M (m)	027 042 098 051 077 (109)	1B 2A 72 33 41 (6D)
TRANSFER RASTER DATA	# of Bytes	Ec*b#W[Data]	027 042 098 #...# 087	1B 2A 62 #...# 57
END RASTER GRAPHICS	—	Ec*rB (b)	027 042 114 066 (98)	1B 2A 72 42 (62)
RASTER HEIGHT	# Raster Rows	Ec*r#T (t)	027 042 114 #...# 084 (116)	1B 2A 72 #...# 54 (74)
RASTER WIDTH	# Pixels of the Specified Resolution	Ec*r#S (s)	027 042 114 #...# 083 (115)	1B 2A 72 .:...# 53 (73)
THE PRINT MODEL				
IMAGING				
SELECT PATTERN	Solid Black (default)	Ec*v0T	027 042 118 048 084 (116)	1B 2A 76 30 54 (74)
	Solid White	Ec*v1T	027 042 118 049 084 (116)	1B 2A 76 31 54 (74)
	HP-defined Shading Pattern	Ec*v2T	027 042 118 050 084 (116)	1B 2A 76 32 54 (74)
	HP-defined Cross-Hatched Pattern	Ec*v3T	027 042 118 051 084 (116)	1B 2A 76 33 54 (74)
SELECT SOURCE TRANSPARENCY MODE	Transparent	Ec*v0N	027 042 118 048 078 (110)	1B 2A 76 31 42 (6E)
	Opaque	Ec*v1N	027 042 118 049 078 (110)	1B 2A 76 31 42 (6E)
SELECT PATTERN TRANSPARENCY MODE	Transparent	Ec*v0O	027 042 118 048 079 (111)	1B 2A 76 30 43 (6F)
	Opaque	Ec*v1O	027 042 118 049 079 (111)	1B 2A 76 31 43 (6F)
RECTANGLE DIMENSIONS				
RECTANGLE WIDTH (Horizontal Size)	# of Dots	Ec*c#A (a)	027 042 099 #...# 065 (97)	1B 2A 63 #...# 41 (61)
	# of Decipoints	Ec*c#H (h)	027 042 099 #...# 072 (104)	1B 2A 63 #...# 48 (68)
RECTANGLE HEIGHT (Vertical Size)	# of Dots	Ec*c#B (b)	027 042 099 #...# 066 (98)	1B 2A 63 #...# 42 (62)
	# of Decipoints	Ec*c#V (v)	027 042 099 #...# 086 (118)	1B 2A 63 #...# 56 (76)

Values in the parentheses identify the lower case of the termination character. This value is used if the printer command is combined.

Table B-1. LaserJet III Printer Commands — PCL Context (continued)

FUNCTION	PARAMETER	COMMAND	DECIMAL VALUE	HEXADECIMAL VALUE
RECTANGULAR AREA FILL				
FILL RECTANGULAR AREA	Solid Black	Ec*c0P	027 042 099 048 080 *(112)*	1B 2A 63 30 50 *(70)*
	Erase (Solid White Area Fill)	Ec*1P	027 042 099 049 080 *(112)*	1B 2A 63 31 50 *(70)*
	Shaded Fill	Ec*c2P	027 042 099 050 080 *(112)*	1B 2A 63 32 50 *(70)*
	Cross-hatched Fill	Ec*c3P	027 042 099 051 080 *(112)*	1B 2A 63 33 50 *(70)*
	User Defined	Ec*c4P	027 042 099 052 080 *(112)*	1B 2A 63 34 50 *(70)*
	Current Pattern	Ec*c5P	027 042 099 053 080 *(112)*	1B 2A 63 35 50 (70)
PATTERN ID	% of Shading or Type of Pattern	Ec*c#G	027 042 099 #...# 071 *(103)*	1B 2A 63 #...# 47 *(67)*
SHADING	2% Gray	Ec*c2G *(g)*	027 042 099 050 071 *(103)*	1B 2A 63 32 47 *(67)*
	10% Gray	Ec*c10G *(g)*	027 042 099 049 048 071 *(103)*	1B 2A 63 31 30 47 *(67)*
	15% Gray	Ec*c15G *(g)*	027 042 099 049 053 071 *(103)*	1B 2A 63 31 35 47 *(67)*
	30% Gray	Ec*c30G *(g)*	027 042 099 051 048 071 *(103)*	1B 2A 63 33 30 47 *(67)*
	45% Gray	Ec*c45G *(g)*	027 042 099 052 053 071 *(103)*	1B 2A 63 34 35 47 *(67)*
	70% Gray	Ec*c70G *(g)*	027 042 099 055 048 071 *(103)*	1B 2A 63 37 30 47 *(67)*
	90% Gray	Ec*c90G *(g)*	027 042 099 057 048 071 *(103)*	1B 2A 63 39 30 47 *(67)*
	100% Gray	Ec*c100G *(g)*	027 042 099 049 048 048 071 *(103)*	1B 2A 63 31 30 30 47 *(67)*
PATTERN	1 Horiz. Line	Ec*c1G *(g)*	027 042 099 049 071 *(103)*	1B 2A 63 31 47 *(67)*
	2 Vert. Lines	Ec*c2G *(g)*	027 042 099 050 071 *(103)*	1B 2A 63 32 47 *(67)*
	3 Diagonal Lines	Ec*c3G *(g)*	027 042 099 051 071 *(103)*	1B 2A 63 33 47 *(67)*
	4 Diagonal Lines	Ec*c4G *(g)*	027 042 099 052 071 *(103)*	1B 2A 63 34 47 *(67)*
	5 Square Grid	Ec*c5G *(g)*	027 042 099 053 071 *(103)*	1B 2A 63 35 47 *(67)*
	6 Diagonal Grid	Ec*c6G *(g)*	027 042 099 054 071 *(103)*	1B 2A 63 36 47 *(67)*
MACROS				
MACRO ID	Macro ID #	Ec&f#Y *(y)*	027 038 102 #...# 089 *(121)*	1B 26 66 #...# 59 *(79)*
MACRO CONTROL	Start Macro Def.	Ec&f0X *(x)*	027 038 102 048 088 *(120)*	1B 26 66 30 58 *(78)*
	Stop Macro Def.	Ec&f1X *(x)*	027 038 102 049 088 *(120)*	1B 26 66 31 58 *(78)*
	Excecute Macro	Ec&f2X *(x)*	027 038 102 050 088 *(120)*	1B 26 66 32 58 *(78)*
	Call Macro	Ec&f3X *(x)*	027 038 102 051 088 *(120)*	1B 26 66 33 58 *(78)*
	Enable Overlay	Ec&f4X *(x)*	027 038 102 052 088 *(120)*	1B 26 66 34 58 *(78)*
	Disable Overlay	Ec&f5X *(x)*	027 038 102 053 088 *(120)*	1B 26 66 35 58 *(78)*
	Delete Macros	Ec&f6X *(x)*	027 038 102 054 088 *(120)*	1B 26 66 36 58 *(78)*
	Delete All Temp. Macros	Ec&f7X *(x)*	027 038 102 055 088 *(120)*	1B 26 66 37 58 *(78)*
	Delete Macro ID	Ec&f8X *(x)*	027 038 102 056 088 *(120)*	1B 26 66 38 58 *(78)*
	Make Temporary	Ec&f9X *(x)*	027 038 102 057 088 *(120)*	1B 26 66 39 58 *(78)*
	Make Permanent	Ec&f10X *(x)*	027 038 102 049 048 088 *(120)*	1B 26 66 31 30 58 *(78)*
PROGRAMING HINTS				
DISPLAY FUNCTIONS	ON	EcY	027 089	1B 59
	OFF	EcZ	027 090	1B 5A
END-OF-LINE WRAP	Enabled	Ec&s0C *(c)*	027 038 115 048 067 *(99)*	1B 26 73 30 43 *(63)*
	Disabled	Ec&s1C *(c)*	027 038 115 049 067 *(99)*	1B 26 73 31 43 *(63)*

Values in the parentheses identify the lower case of the termination character. This value is used if the printer command is combined.

Table B-2. LaserJet III Printer Commands — HP-GL/2 Context

COMMAND	MNEMONIC	PARAMETERS*
DUAL CONTEXT EXTENSIONS		
ENTER PCL MODE	Esc%#A	0 – Retain previous PCL cursor position and pallette 1 – Use current HPGL pen position and pallette
RESET	EscE	None
PRIMARY FONT	FI	Font_ID
SECONDARY FONT	FN	Font_ID
SCALABLE OR BITMAPPED FONTS	SB	0 – Scalable fonts only 1 – Bitmapped fonts allowed
PALETTE EXTENSIONS		
TRANSPARENCY MODE	TR	0 – Off (opaque) 1 – On (transparent)
NUMBER OF PENS	NP	2,4,8
SCREENED VECTORS	SV	[screen_type[,shading[,index]]]

HP-GL/2 Kernel		
VECTOR GROUP *Parameters in brackets are optional.		
ARC ABSOLUTE	AA	x_center,y_center,sweep_angle [,chord_angle];
ARC RELATIVE	AR	x_increment,y_increment,sweep_angle [,chord_angle];
ABSOLUTE ARC THREE POINT	AT	x_inter,y_inter,x_end,y_end [,chord_angle];
PLOT ABSOLUTE	PA	[x,y ... [,x,y]];
PLOT RELATIVE	PR	[x,y ... [,x,y]];
PEN DOWN	PD	[x,y ... [,x,y]];
PEN UP	PU	[x,y ... [,x,y]];
RELATIVE ARC THREE POINT	RT	x_incr_inter,y_incr_inter,x_incr_end,y_incr-end [,chord_angle];
POLYLINE ENCODED	PE	[flag[val]\|coord_pair ... [flag[val]\|coord_pair]];

Table B-2.
LaserJet III Printer Commands — HP-GL/2 Context (continued)

HP-GL/2 Kernel (continued)		
COMMAND	**MNEMONIC**	**PARAMETERS***
POLYGON GROUP ***Parameters in brackets are optional.**		
CIRCLE	CI	radius [,chord_angle];
FILL RECTANGLE ABSOLUTE	RA	x_coordinate,y_coordinate;
FILL RECTANGLE RELATIVE	RR	x_increment,y_increment;
EDGE RECTANGLE ABSOLUTE	EA	x_coordinate,y_coordinate;
EDGE RECTANGLE RELATIVE	ER	x_increment,y_increment;
FILL WEDGE	WG	radius,start_angle,sweep_angle [,chord_angle];
EDGE WEDGE	EW	radius,start_angle,sweep_angle [,chord_angle];
POLYGON MODE	PM	polygon_definition;
FILL POLYGON	FP	
EDGE POLYGON	EP	

Table B-2.
LaserJet III Printer Commands — HP-GL/2 Context (continued)

HP-GL/2 Kernel (continued)		
COMMAND	**MNEMONIC**	**PARAMETERS***
CHARACTER GROUP *Parameters in brackets are optional.		
SELECT STANDARD FONT	SS	
SELECT ALTERNATE FONT	SA	
ABSOLUTE DIRECTION	DI	[run,rise];
RELATIVE DIRECTION	DR	[run,rise];
ABSOLUTE CHARACTER SIZE	SI	[width,height];
RELATIVE CHARACTER SIZE	SR	[width,height];
CHARACTER SLANT	SL	[tangent_of_angle];
EXTRA SPACE	ES	[width [,height]]
STANDARD FONT DEFINITION	SD	[kind,value ... [,kind,value]];
ALTERNATE FONT DEFINITION	AD	[kind,value ... [,kind,value]];
CHARACTER FILL MODE	CF	[fill_mode[,edge_pen]];
LABEL ORIGIN	LO	[position];
LABEL	LB	[char ... [char]]1bterm
DEFINE LABEL TERMINATOR	DT	[1bterm[,mode]];
CHARACTER PLOT	CP	[spaces,lines];
TRANSPARENT DATA	TD	[mode];
DEFINE VARIABLE TEXT PATH	DV	[path[,line]];

Table B-2.
LaserJet III Printer Commands — HP-GL/2 Context (continued)

HP-GL/2 Kernel (continued)		
COMMAND	**MNEMONIC**	**PARAMETERS***
LINE AND FILL ATTRIBUTES GROUP *Parameters in brackets are optional.		
LINE TYPE	LT	[line_type[,pattern_length[,mode]]];
LINE ATTRIBUTES	LA	[kind,value ... [,kind,value]];
PEN WIDTH	PW	[width[,pen]];
PEN WIDTH UNIT SELECTION	WU	[type];
SELECT PEN	SP	[pen];
SYMBOL MODE	SM	[char];
FILL TYPE	FT	[fill_type[,option1[,option2]]];
ANCHOR CORNER	AC	[x_coordinate,y_coordinate];
RASTER FILL DEFINITION	RF	[index[,width,height,pen_nbr ... pen_nbr]];
USER DEFINED LINE TYPE	UL	[index[,gap1 ... gapn]];
CONFIGURATION AND STATUS GROUP *Parameters in brackets are optional.		
SCALE	SC	[x1,x2,y1,y2[,type[,left,bottom]]]; or [x1,xfactor,y1,yfactor,2];
INPUT WINDOW	IW	[xLL,yLL,xUR,yUR];
INPUT P1 AND P2	IP	[p1x,p1y[,p2x,p2y]];
INPUT RELATIVE P1 AND P2	IR	[p1x,p1y[,p2x,p2y]];
DEFAULT VALUES	DF	
INITIALIZE	IN	[n];
ROTATE COORDINATE SYSTEM	RO	[angle];
ADVANCE FULL PAGE	PG	[n];
REPLOT	RP	[n];

C

Environmental Specifications

Location Requirements

The LaserJet III printer should be located in a well ventilated room. The environment should be stable, with no abrupt changes in temperature or humidity. Place the printer on a sturdy, level surface. The following information shows the suggested amount of space to leave around the printer:

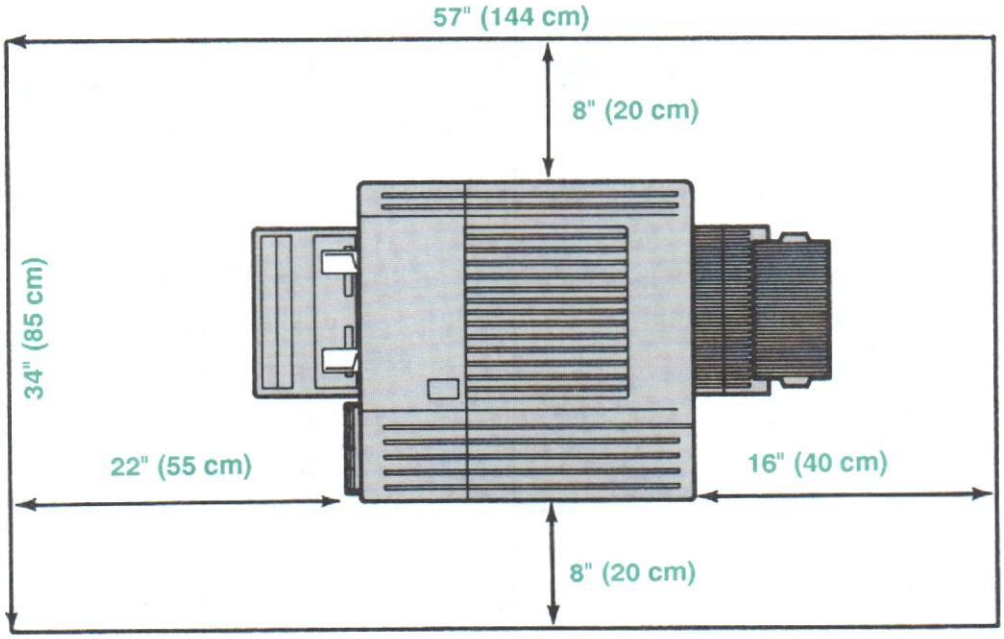
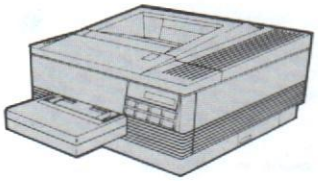


Figure C-1. Printer Clearance Dimensions.

Physical Dimensions



Height	9.80 in. (250 mm)
Width	18.10 in (459 mm)
Depth (body)	19.70 in (500 mm)
Depth (trays extended)	31.40 in (797 mm)
Weight	54.6 lbs (24.8kg)

Electrical Requirements

	Model A	Model AB
Source	100 to 115 volts (±10%)	220 to 240 volts (±10%)
Frequency	60 Hz	50 Hz
Power Consumption		
Printing	870 watts maximum	850 watts maximum
Standby	170 watts (nominal)	170 watts (nominal)

Environmental Specifications

Temperature (Printer and EP-S Cartridge)

Operating: 50 to 91° F (10 to 32.5° C)
Storage: 32 to 95° F (0 to 35° C)

Humidity

Operating: 20 to 80% Relative Humidity
Storage: 10 to 80% Relative Humidity

Altitude

Operating: 0 to 15,000 ft. (0 to 4600 m)
Storage: 1 to 49,200 ft. (0 to 15,300 m)

FCC Regulations

This equipment generates and uses radio frequency energy and, if not installed and used properly (that is, in strict accordance with the manufacturer's instructions), it may cause interference to radio and television reception. The equipment has been type tested and found to comply within the limits for a Class B computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference in a residential installation.

Note



Use of a shielded interface cable is required to comply within the Class B limits in subpart B of Part 15 of FCC rules.

However, there is no guarantee that interference to radio or television reception will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient receiving antenna.
- Relocate computer with respect to receiver.
- Move computer away from receiver.
- Plug computer into different outlet so computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.

The Federal Communications Commission has prepared a booklet titled *Interference Handbook* (1986), which may be helpful to you. This booklet (stock number 004-000-004505-7) may be purchased from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

Safety Information

Laser Safety

This printer is certified as a Class 1 laser product under the U. S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the *Radiation Control for Health and Safety Act* of 1968. This means that the printer does not produce hazardous laser radiation.

Since radiation emitted inside the printer is completely confined within protective housings and external covers, the laser beam cannot escape from the machine during any phase of user operation.

CDRH Regulations

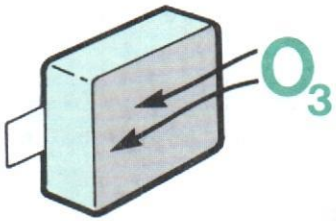
The Center of Devices and Radiological Health (CDRH) of the U. S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured from August 1, 1976. Compliance is mandatory for products marketed in the United States. The label shown in the following figure indicates compliance with the CDRH regulations and must be attached to laser products marketed in the United States.



Warning

Use of controls, adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

Ozone Emission



The corona assemblies found in laser printers and photocopiers generate ozone gas (O_3) as a by-product of the electrophotographic process. Ozone is only generated while the printer is printing (while the coronas are energized).

UL Standards for Ozone

A standard for ozone emissions has been established by Underwriters Laboratory (UL). All LaserJet family printers meet this standard when shipped from the factory to our customers.

Employer Responsibilities

Because ozone can be an irritant, various regulatory agencies have established limits to the amount of ozone to which employees may be exposed. The workplace specifications proposed by the Underwriters Laboratory are:

- A person may not be exposed to an average concentration of greater than 0.1 part per million (PPM) of ozone for a period of eight hours.
- In addition, the employee should not be exposed to peak concentrations of ozone greater then 0.3 PPM for longer than 15 minutes.

The employer is responsible for providing a work environment that meets these standards.

Recommendations for Minimizing Ozone Exposure

Almost all ozone concerns arise from abnormal site or operating conditions. The following conditions may generate an ozone complaint:

- installation of multiple laser printers in a confined area
- extremely low relative humidity
- poor room ventilation
- the exhaust port of the printer is directed towards the face of personnel
- the existing ozone filter is in poor condition

- long, continuous printing combined with any of the above

Inspect your work environment for the operating conditions listed above if you believe ozone emissions are a problem in your area.

Some people are extremely sensitive to ozone odor. In such cases, it is advisable to position the printer away from the sensitive user.

The ozone filter is user-replaceable and should be changed after the equivalent of 50,000 single-sided sheets have been printed. See Chapter 6 in this manual for information on changing the ozone filter.

German Regulations

According to West German Standard VDE 0836, printer servicing requires at least two servicemen. The following notice is required to be printed in German and applies to printer operations and servicing in Germany.

Funkentstörung Deutschland
Herstellerbescheinigung

Hiermit wird bescheinigt, daß das Gerät HP 33449AB in Übereinstimmung mit den Bestimmungen von *Postverfügung 1046/84* funkentstört ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

Wird das Gerät innerhalb einer Anlage betrieben,

- so muß bei Inanspruchnahme der *Allgemeinen Genehmigung FTZ 1046/84* die gesamte Anlage der oben genannten Genehmigung entsprechen.
- die mit einer *FTZ-Serienprüfnummer* gekennzeichnet ist, und für die eine Betriebsgenehmigung vorliegt oder beantragt wird, so sind in der Regel keine weiteren Schritte notwendig.

Finnish Regulations

The following notice is required to be printed in Finnish and applies to printer operation in Finland:

T U R V A L L I S U U S Y H T E E N V E T O

LASERTURVALLISUUS

HP 33449AB laserkirjoitin on käyttäjän kannalta turvallinen luokan 1 laserlaite. Laitteen on tarkastanut Suomessa Työterveyslaitos ja tyyppihyväksynyt Työsuojeluhallitus, Työsuojeluhallituksen hyväksyntänumero TSH/713/6019/89.

Tarkastuksessa laitteen turvallisuusluokka on määrätty valtioneuvoston päätöksen N:o 472/1985 ja standardin SFS-IEC 825 mukaisesti. Laitte on myös varustettu turvallisuusluokan imoittavalla merkinnällä:

CLASS 1 LASER PRODUCT

Normaalikäytössä laitteen suojakotelo estää lasersäteen pääsyn laitteen ulkopuolelle.

HUOLTO

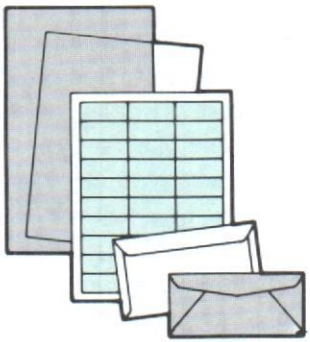
Kirjoittimen sisällä ei ole käyttäjän huollettavissa olevia kohteita. Laitteen saa avata ja huoltaa ainoastaan laserlaitteiden huoltamiseen koulutettu henkilö. Tällaiseksi huoltotoimenpiteeksi ei katsota väriainekasetin vaihtamista, paperiradan puhdistusta tai muita käyttäohjeessa lueteltuja, käyttäjälle tehtäväksi tarkoitettuja ylläpitotoimia.

Kirjoittimen turvallisuusluokitus muuttuu mikäli sen suojakotelo avataan. Laitteen sisällä olevassa laseryksikössä on laserdiodi, joka laitteen toimiessa lähettää silmälle näkymätontä, luokan 3B lasersäteilyä.

D

Paper and Print Media Specifications

Introduction

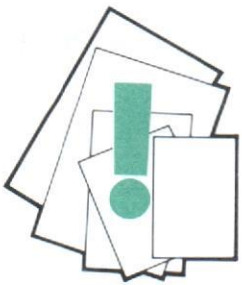


This appendix provides guidelines for selecting paper and other print media that will perform well in your LaserJet III printer.

Hewlett-Packard neither warrants nor recommends the use of a particular paper or other print media (such as overhead transparencies, mailing labels, and envelopes). Paper properties are subject to change by paper manufacturers and Hewlett-Packard has no control over such changes. The customer assumes all responsibility as to the quality and performance of paper.

Although you can test paper to characterize the performance of a particular brand of paper, only careful quality control by the paper manufacturer and proper paper handling from the manufacturer to your printer can ensure long-term satisfaction.

Questions answered in this appendix



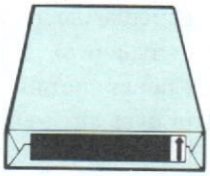
- Why is so much emphasis placed on selecting the right kind of media? *See page D-2, "Media".*
- What kinds of media can I use with my printer?
 - □ *Papers - see pages D-2 through D-7.*
 - □ *Adhesive Labels - see pages D-8 through D-10.*
 - □ *Overhead transparency film - see page D-11.*
 - □ *Envelopes - see pages D-12 through D-19.*
- What should I consider when selecting paper? *See page D-5.*
- How should I store the paper for my printer? *See pages D-20 and D-21.*

Media

Several types of media can be used with the Hewlett-Packard LaserJet III, provided they meet certain guidelines. Media that does not meet the guidelines outlined in this appendix may:

- increase the incidence of paper jams.
- cause premature wear to the printer.
- degrade print quality
- increase repair costs.

High-quality paper



Use conventional white xerographic paper for most printing applications. The paper should be of good quality, free of cuts, nicks, tears, spots, loose particles, dust, wrinkles, voids, and curled or bent edges. Xerographic papers, also called photocopy or xerocopy papers, are usually made from chemical wood pulp and characterized by a smooth surface, controlled electrical properties, heat stability, and cleanliness. These characteristics will ensure good image transfer and toner fixing without excessive curl. Hewlett-Packard recommends testing a particular paper, prior to large purchases, to determine if the performance is acceptable.

Some applications may require a paper having a more prestigious look or feel. Bond papers generally have a watermark and often use cotton fiber. These papers tend to have a rougher surface and properties may not be controlled like xerographic grades. However, your LaserJet III will print on many of these papers satisfactorily. Also, some manufacturers are making laser grade bond papers which have properties optimized for laser printing.

Colored paper with heat resistant pigments

Colored paper can be used in the Hewlett-Packard LaserJet III. Do not use paper with a colored coating that has been added after the paper is produced. Pigments used must be able to withstand the printer's fusing temperatures of 392° F (200° C) without deterioration. Colored paper should also be of the same high quality as white photocopy paper.

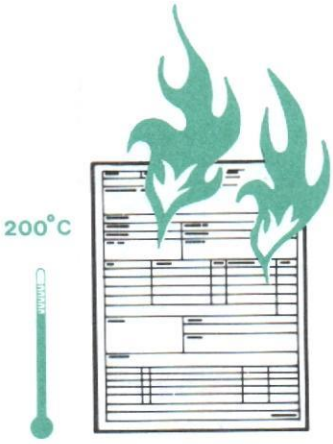
Heavy paper stock

Use paper that falls within the 16 to 36 pound (60 to 135 g/m^2) range. DO NOT use paper stock heavier than 36 pound; misfeeds, mis-stacking problems, paper jams, poor toner fusing, poor print quality and excessive mechanical wear can result.

Note

One of the frequently used terms in the paper industry is **basis weight.** For example, when you see paper listed as 28 pound paper, you are being given a weight specification. In English units, basis weight refers to the weight of 500 sheets of 17 by 22 inch paper. Basis weight is measured on a metric scale as the weight, in grams, of one square meter of paper.

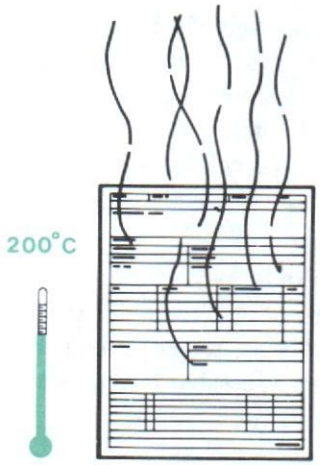
Forms pre-printed with heat-resistant ink



To avoid problems with pre-printed forms, observe the following guidelines:

- Notify your forms supplier that the form will be used in a laser printer.
- Forms must be printed with heat-resistant inks that will not melt, vaporize, or release hazardous emissions when subject to the printer's approximately 200° C (392° F) fusing temperature for 0.1 second.

 Before using pre-printed forms, make sure the ink is completely dry to prevent it from transferring to the printer rollers and contaminating the internal printer mechanisms.



- During the pre-printing process, care must be taken to prevent a change in the moisture content of the paper. Forms should be sealed in a moisture-proof wrapping to prevent moisture changes during storage.

Before Purchasing Paper

The Hewlett-Packard LaserJet III printer is designed to be as flexible as possible in the types of paper it can use. Since there are many varieties of paper and variations in the paper manufacturing process, you should test a particular paper in your own environment to decide if it performs acceptably.

Select paper that meets the specifications

The first step in choosing paper is to select paper that meets the specifications listed in this appendix. Some papers that meet these specifications may still not print well because of variations in the paper manufacturing process and in the printing environment. However, these guidelines should still be a primary consideration when choosing paper for your printer.

Test before purchasing large lots of paper



The second step in choosing paper, particularly when you are planning a large purchase, is to print a small quantity in your particular environment. We recommend that you test at least two reams. Subject the paper to the temperature, the humidity and printing application which it will be operating in. *DO NOT purchase large lots of paper prior to testing it*! Hewlett-Packard recommends that you ask your paper vendor for a guarantee that the paper will perform satisfactorily in your laser printer, and that the vendor will assume responsibility for the replacement of any paper that will not print acceptably.

Recommended Media Guidelines

Table D-1 summarizes the specifications to consider when selecting paper. Your paper vendor can explain the terms in this table and should be able to provide you with paper that meets all the criteria.

Note

It is possible that paper could meet all of the general specifications listed in this table and still not print satisfactorily because of abnormal characteristics of the printing environment or other variables over which Hewlett-Packard has no control. For this reason we recommend testing any paper before buying large quantities.

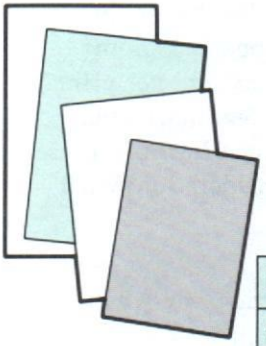


Table D-1. Paper Specifications

Basis Weight	16 to 36 pound (60 to 135 g/m^2)
Grain	Long grain
Moisture Content	4% to 6% by weight
Furnish (Composition)	100% chemical wood pulp and/or cotton fiber
Acid Content	5.5 pH minimum
Ash Content	Not to exceed 10%
Opacity	85% minimum
Brightness	83% minimum
Caliper	3.0 to 7.0 mils

Table D-1. Paper Specifications (continued)

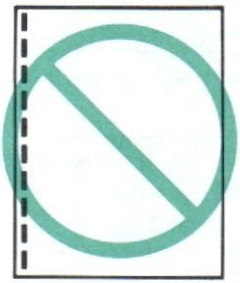
Curl	Inream: flat within 0.3 inch (8mm) Printed: flat within 0.8 inch (20mm)
Cut edge conditions	Cut with sharp blades with no visible fray
Finishing	Cut sheet to ± 0.031 inch of nominal, ± 0.2° square
Fusing Compatibility	Must not scorch, melt, offset or release hazardous emissions when heated to 200° C (392° F) for 0.1 second.
Packaging	Moisture-proof ream wrap
Smoothness	60 to 250 Sheffield (rougher surfaces tend to reduce image quality)
Stiffness	1.6 to 7.5 machine direction/0.6 to 3.5 cross direction (Taber)
Surface Strength	12 minimum wax pick (Dennison)
Electrical Surface Resistivity	2.0 to 15 x 10^{10} ohms/sq. (conditioned at 23° C and 50% relative humidity)
Electrical Volume Resistivity	1.2 to 15 x 10^{11} ohms x cm (conditioned at 23° C and 50% relative humidity)

Papers to avoid

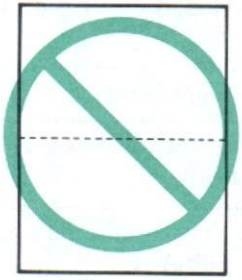
- Damaged, wrinkled, or irregularly shaped paper
- Glossy smooth paper
- Heavily textured or embossed paper
- Multipart forms
- Carbonless or chemically coated papers
- Paper and inks that are not compatible with the heat and pressure of fusing.

Paper with cutouts or perforations

Although we do not recommend paper with cutouts or perforations for use in the HP LaserJet III, if you choose to use this type of paper, here are some guidelines to follow. Care should be taken when using these special application papers to conform to the following:



- **Cutouts:** A cutout is any portion of the paper which has been removed, including binder holes, notches, square cuts, etc. Do not print at a cutout location or closer than 4 mm (0.10 in.) to the edge of a cutout because toner may pass through and cause excessive build-up inside the printer and on the back side of the paper. Holes should be cut cleanly, without burrs, to avoid multiple feed, contamination problems or paper jams. Cutout paper must conform to the general specifications for plain white xerographic paper.



- **Perforations:** Paper with internal perforations such as multi-part forms may cause difficulties with misfeeds and paper jams. Avoid perforations which run across the page perpendicular to the paper path. The perforations should be cleanly cut and should be made from the direction of the image side. This helps ensure the edge trimmings are away from and will not scratch the surface of the EP-S cartridge's photo-sensitive drum. DO NOT print closer than 4mm (0.10 in.) to a perforation.

Adhesive labels

An adhesive label is paper with a pressure-sensitive adhesive backing. The three components of label stock are the top or face sheet, the adhesive, and the liner or carrier sheet, sometimes referred to as the backing. *Always use the rear (face-up) output tray when you are printing labels.* Note the following points about label stock:

- **Top or face sheets:** The top sheet, which is the printed surface, is usually composed of photocopy paper.

- **Carrier sheets:** The carrier sheet should be bleached sulfate stock and silicone-coated for easy release of the face sheet.
- **Adhesive:** The adhesive should be an acrylic-based emulsion, which is more stable than other adhesives at the temperatures encountered in the printer's fusing process.

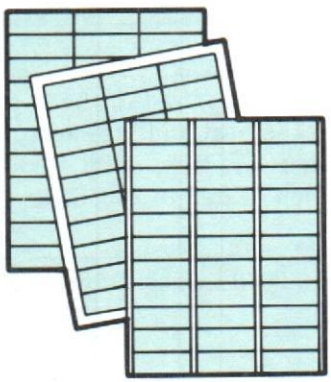
Warning

Air quality testing has been conducted on a similar Hewlett-Packard printer product in accordance with National Institute for Occupational Safety and Health (NIOSH) test procedures and standards. As a result of this testing, only labels using an acrylic-based adhesive are recommended for use.

Caution

Use only labels recommended for use in laser printers.

When printing on labels, *always use the rear (face-up) output tray* to avoid excessive curling of the sheets, severe paper jams, and to avoid potential damage to the printer.



Adhesives should not come in direct contact with any part of the printer because the label stock may stick to the photosensitive drum or the rollers, causing toner offset or paper jams. No adhesive should be exposed between the labels. To test label stock for adhesive exposure, press a sheet of plain paper against a sheet of label stock. The plain paper should not adhere to the label stock at all.

- **Label arrangement:** Labels should be arranged on the carrier sheet so that they cover the entire page, *with the only exposed spaces being lengthwise down the sheet.* Using label stock with spaces between labels often results in labels peeling off during the printing cycle, causing serious jamming problems. Labels can be specially manufactured to leave a margin around the outside edges corresponding to the outer margins of the

printable area. If labels are manufactured this way, do not remove the excess top sheet material from the carrier sheet until after printing. These precautions will help prevent problems resulting from labels pulling loose from the carrier sheet.

- **Label curl:** Labels must lie flat with no more than $\frac{1}{2}$ inch of curl in any direction.
- **Poorly manufactured labels:** Do not use labels having wrinkles, bubbles or other indications of delamination. Use of such labels may result in damage to the printer due to labels peeling off inside the printer.

Hewlett-Packard has tested labels such as Avery laser printer and HP LaserJet labels, and found the performance acceptable. However, you should test any label stock you are considering to verify its performance is acceptable.

See the *Accessories and Supplies for Your LaserJet Printers* brochure for ordering information and label part numbers.

Table D-2. Adhesive Label Specifications

Specification	Description
Face Sheet	Must meet specifications in Table D-1.
Fusing Compatibility	All adhesives, liners, facestocks and other materials used in the label construction must be compatible with the heat and pressure of the fusing process. Materials must not discolor, melt, offset material or release hazardous emissions when heated to 200° C for 0.1 seconds.
Construction	Total construction caliper must not exceed 0.0070 inches (0.18mm).

Overhead transparencies

Hewlett-Packard has tested overhead transparency film such as HP overhead transparencies and found the performance acceptable.

Caution

Use only overhead transparencies recommended for use in laser printers.

When printing on overhead transparencies, *always use the rear (face-up) output tray* to avoid excessive curling of the sheets, severe paper jams, and to avoid potential damage to the printer.



If sticking occurs, remove each sheet from the output tray before printing the next sheet of film.

Overhead transparencies should meet the specifications provided in Table D-3.

Table D-3. Transparency Specifications

Thickness	0.100 to 0.110 mm	3.9 to 4.5 mils
Cutting dimension tolerance	± 0.7 mm	0.031 inch
Cutting angle	90° ± 0.2°	

Hewlett-Packard supplies overhead transparencies through its Direct Marketing Division. To order, call 800-538-8787 (call 800-387-3867 in Canada; call 0374-441212 in U.K.).

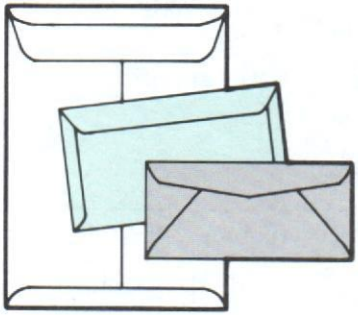
Before Purchasing Envelopes

Follow these recommendations:

Select envelopes that meet the specifications

See envelope specifications listed on page D-18, Table D-4.

Test before purchasing large lots of envelopes



Before purchasing, test samples of the envelopes you are thinking of buying to determine if they perform acceptably. Long term satisfaction requires process quality control by the envelope manufacturer and proper handling of the envelopes until use.

Hewlett-Packard neither warrants nor recommends the use of a particular paper or other print media (such as overhead transparencies, mailing labels, and envelopes). Paper properties are subject to change by paper manufacturers, and Hewlett-Packard has no control over such changes. The customer assumes all responsibility as to the quality and performance of envelopes.

Store properly

Store and handle your envelopes carefully. Store them where they can lie flat and where the edges will not be damaged. Keep them away from high humidity and moisture.

Avoid pressure seals

Avoid envelopes that use encapsulating types of adhesives that do not require moistening, but rely instead on pressure to seal them. The Hewlett-Packard LaserJet III's fusing process seals these envelopes. Always test a sample of envelopes to verify their general suitability.

Buy from a reliable vendor

Both the manufacturer and the vendor of the envelopes you select should be able to provide you with information about the envelopes' suitability for use in a laser printer. Inform your vendor you are using a laser printer. Hewlett-Packard cannot guarantee every kind of envelope that is manufactured. Your paper vendor should be your contact when selecting envelopes for your individual application needs.

Envelope Guidelines

Thin, sharply creased, high quality envelopes are best. Hewlett-Packard Company neither warrants nor recommends the use of a particular brand of envelope. Envelope properties are subject to change by envelope manufacturers and Hewlett-Packard Company has no control over such changes. The entire responsibility as to the quality and performance of envelopes is with the customer. Although testing helps to characterize the envelope's performance, long term satisfaction requires process quality control by the envelope manufacturer and proper handling until use.

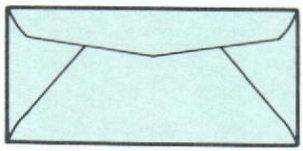
Envelopes will not feed or image as well as other media because of folding and multiple layers of paper. However, many types of envelope perform acceptably.

Sizes

Use only envelopes within the following sizes:

- Minimum: 3.5 x 7.5 inches (89 x 191 mm)
- Maximum: 7.2 x 10.1 inches (183 x 256 mm)

Envelope construction



Hewlett-Packard has tested and found that many styles of envelopes can be printed using either the manual feed guides on the paper tray or the optional envelope tray. Some envelope styles perform better than others because their construction is better suited to feeding through a printer.

An envelope with good construction has a leading edge that enters the printer straight and a sharp, well-creased fold, having no more than two thicknesses of paper. An envelope with poor construction has edges folded smaller than normal, causing a thick leading edge near a corner (see Figure D-1). This baggy construction may cause the envelope to buckle as it passes through the printer, resulting in a wrinkled envelope or a jammed printer.

The adhesives used in envelopes should not scorch, melt, offset, or release hazardous emissions when heated to 200° C (392° F) for 0.1 second.

Manufacturer's folding accuracy may vary enough to cause some of their envelopes to feed well and others to jam. Select envelopes of the quality and consistency you require.

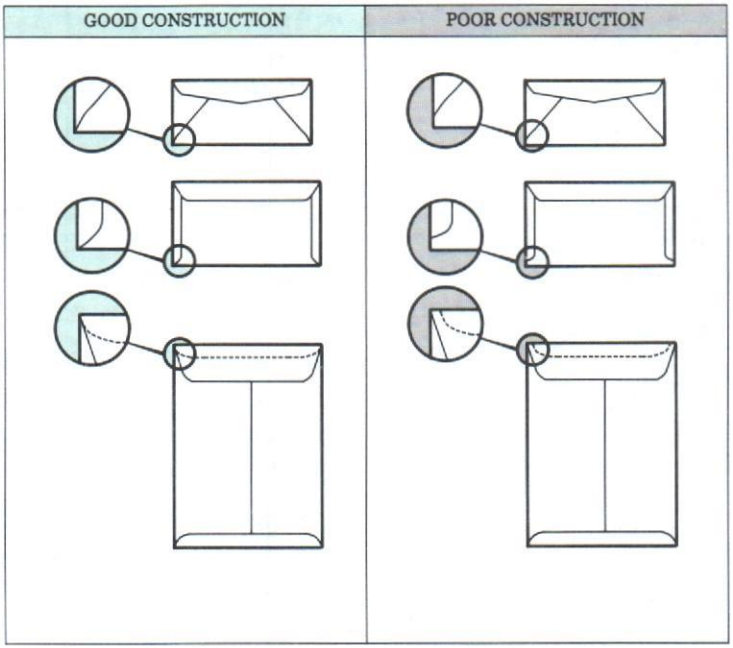


Figure D-1. Envelope Construction

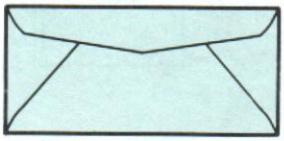
Note

The basis weight of the envelope paper should not exceed 24 pounds (90 grams/m^2) or jamming may result. Envelopes should lie flat with less than 0.25 inch of curl, and not be wrinkled, nicked, or otherwise damaged.

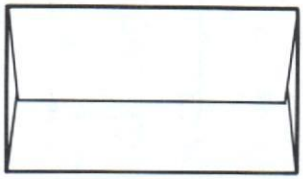
Always use rear (face-up) output tray when printing envelopes.

Caution

UNDER NO CIRCUMSTANCES SHOULD YOU USE ENVELOPES HAVING CLASPS, SNAPS, WINDOWS, OR SYNTHETIC MATERIALS. THESE ITEMS CAN CAUSE SEVERE DAMAGE TO THE PRINTER.



Commercial office (COM-10 size) envelopes with diagonal seams and standard gummed flaps, are the most widely used type of envelope. This style performed the most reliably in Hewlett-Packard testing.

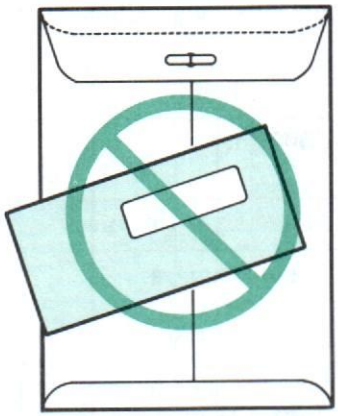


Double side seam construction has vertical seams at both ends of the envelope, rather than diagonal seams. A variety of double side seam envelopes were tested and most performed acceptably.

Envelopes using a peel-off adhesive strip, or more than one flap that folds over to seal, must use adhesives compatible with the heat and pressure of the fusing rollers in the printer. The extra flaps and strips may result in wrinkling or creasing or cause more frequent jamming.

Envelopes must not have a paper weight greater than 24 pound (90 g/m^2). Generally, the larger the envelope, the more difficult it is to feed into the printer. All envelopes must lie flat and have a thin, sharply creased leading edge.

Envelopes to avoid



Envelopes with any of the following characteristics may cause jamming and should *not* be used:

- Envelopes that are poorly manufactured
 - thick edges
 - crooked edges
- Envelopes that are damaged, curled, wrinkled or irregularly shaped.
- Extremely shiny or highly textured envelopes.
- Envelopes with clasps.
- Envelopes with baggy construction or folds that are not sharply creased.
- Envelopes that are embossed.
- Envelopes that have already been printed with a LaserJet printer.

Correct envelope specifications

Your envelope vendor should be able to provide envelopes conforming to the specifications in Table D-4. Inform your vendor you are using the envelopes with a LaserJet III.

Table D-4. Envelope Specifications

Paper	Paper used for envelope construction must meet all of the paper specifications listed in Table D-1.
Furnish	100% chemical wood pulp and/or cotton fiber.
Basis Weight (single layer)	20 to 24 pound (17 x 22 inches per 500 sheets) (75 to 90 grams/m^2)
Caliper	3.3 to 5.5 mils (0.084 to 0.14 mm) single layer thickness
Electrical Properties	Surface resistivity: 2.0 to 15 by 10^{10} ohm/square Volume resistance: 1.2 to 15 x 10^{11} ohm-cm (conditioned at 22°C and 50% relative humidity)
Fusing Compatibility	All inks, adhesives, and other materials of the envelope must be compatible with the heat and pressure of the fusing process. Materials must not discolor, melt, offset material or release hazardous emissions when heated to 200°C (392° F) for 0.1 second.
Finishing	Envelopes must not have any adhesive exposed to the printer. Each must be accurately folded (± 0.04 in.) so there are no more than two thicknesses of paper anywhere along the leading edge. All folds must be sharply creased and the envelope's construction must be tight (not baggy).
Curl	Envelopes must lie flat with no more than 0.25 inch curl across the entire surface.
Moisture Content	4% to 6% by weight.
Smoothness	80 to 180 Sheffield

Note



Envelope performance in a LaserJet printer may be influenced by properties other than those specified here. True verification of performance requires actual testing with the printer. Consistent, acceptable long-term performance of envelopes in a LaserJet printer requires process quality control by the envelope manufacturer, and proper handling until use by the customer.

Envelopes can be printed using either the optional envelope tray or the printer's paper tray in manual feed mode. Whichever method is used, the envelopes should meet all of the criteria in this document.

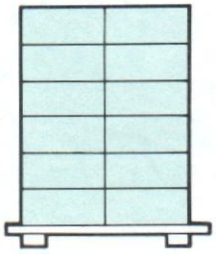
Storing Media

The performance of the Hewlett-Packard LaserJet III depends on the condition of the media you use. Proper media storage is important.

Store paper in its ream wrap until ready to use

When shipping paper through a variety of environments, the entire stack of cartons on the shipping pallet should be wrapped in moisture-proof plastic. When shipped across a body of water, individual cartons should be wrapped as well. Paper should never be shipped in such a manner that it becomes folded or otherwise damaged.

Stack paper properly



Observe the following guidelines when stacking paper:

- DO NOT store cartons directly on the floor; cartons should be placed on a pallet or on shelves.
- Stack no more than six cartons high.
- Stack cartons squarely on top of one another, and stack each carton upright.
- DO NOT store individual reams so that they will curl or warp along the edges.
- DO NOT place other objects on top of the paper, whether it is packaged or unpackaged.

Observe important environmental considerations

Protect paper from temperature and humidity extremes. The Hewlett-Packard LaserJet III is designed to operate in a wide range of environmental conditions, but for best performance, store and use paper at 20° C ± 3° (68° F ± 5°), with a relative humidity of 45% ± 5%.

For optimum print quality in an environment outside the ranges of temperature and humidity shown above, follow these guidelines:

- DO NOT expose the paper to humidity or temperature extremes. Any extreme changes in the environment,

especially if the paper is stored unwrapped, can cause the paper to warp.

- In the case of humidity extremes, keep the paper tightly wrapped in plastic.
- If there is a significant temperature difference between the paper storage area and the printer's operating environment, paper should be allowed to adjust to the temperature in the printer's operating environment before you unwrap it. The greater the temperature difference, and the more paper you have to stabilize, the longer this adjustment period should be.

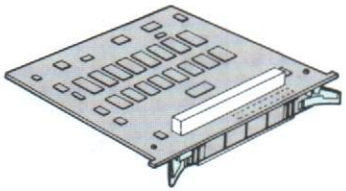
Loading Media Into the Printer

- DO NOT use paper that is creased, folded or damaged.
- Re-wrap partially used reams to maintain original moisture content.
- DO NOT overfill the paper tray.
- DO NOT add small amounts of paper on top of paper already in the tray. This practice greatly increases the occurrence of two or more sheets feeding at once.
- DO NOT load mixed types of paper into the same paper tray.
- Correctly position pre-printed letterhead or punched paper:
 - □ letterhead - print side up, top toward the printer
 - □ punched - left side
- When using photocopy paper that comes with an arrow on the package label, load with the arrow pointing up.
- When experiencing excessive paper curl, try turning the unused paper stack over in the tray, and printing on the opposite side of the paper, or use the face-up tray.

E

Memory Board Installation

General



Installation of the HP 33474B one-megabyte or HP 33475B two-megabyte RAM memory board allows the LaserJet III printer's standard memory to be expanded up to an additional four megabytes. Any combination of one- or two-megabyte boards – up to a maximum of four megabytes of expanded memory – can be installed in either of the printer's two memory expansion slots. Additional printer memory allows page protection to be implemented, more data to be stored in the page buffer, more soft fonts to be downloaded, and more macros to be defined.

Note

For the LaserJet III printer, use only revision "B" or later memory boards (that is, HP 33474B and HP33475B).

If the board is to be installed in a device other than the LaserJet III printer, consult the manual for that device.

Protect the Board and Yourself

Since the memory board contains electrical components easily damaged by small amounts of static electricity, the following cautions should be observed:

- If possible, use an antistatic wrist strap and a grounding mat such as those included in the Electrically Conductive Field Service Grounding Kit (HP 9300-0933).

OR

Before removing the board from its antistatic bag, touch the surface of the bag and any bare sheet metal surface on the printer. Maintain contact with bare metal surfaces on the printer frame while handling the board.

- To prevent static electricity buildup, avoid activities such as moving about the work area, especially if it is carpeted.
- Handle the board carefully at all times. Avoid touching board components. Never flex or put excessive pressure on it.

Warning



Hazardous voltages are present in the printer. Never remove any access cover or work near exposed electrical parts while power is connected.

Identify the Board

Before installation, identify the board.

1. For part numbers, refer to Figure E-1 and the table below (XXXXX indicates that the last five digits are manufacturing numbers that may change).

Part Number	Size
33474-XXXXX	1 Megabyte
33475-XXXXX	2 Megabyte

2. If you have not received the correct board, notify Hewlett-Packard or your authorized dealer immediately.
3. If the board will not be installed immediately, place it in a cool, dry place in its original packaging.

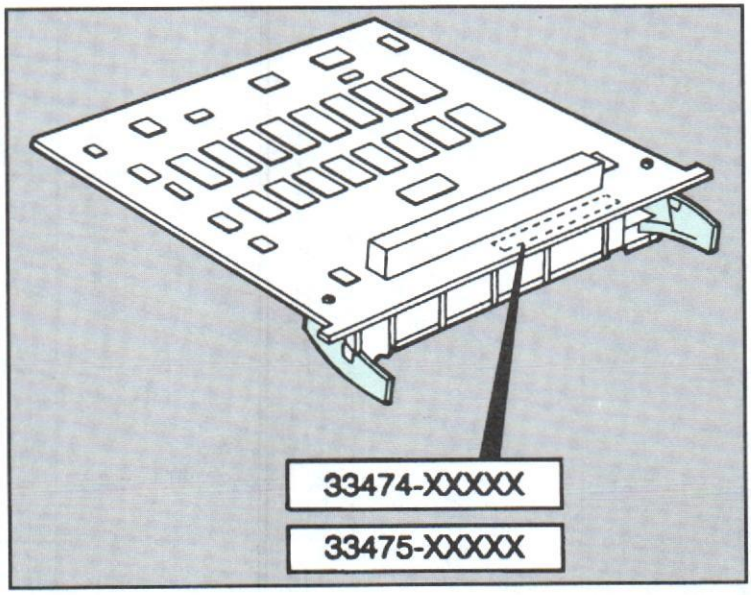


Figure E-1. Memory Board Identification

Install the Board

The following section describes procedures for the removal of two cover plates, insertion of the board(s), and the replacement of the cover plates. Unless otherwise noted, replacement is the reverse of removal. A screwdriver (flat-blade or Phillips) is needed.

Note

First, read all instructions carefully. Make sure all procedures are understood before beginning installation.

1. Switch printer OFF and unplug power cord.
2. In order to remove the plastic RAM Expansion access cover on the printer's left side base, position the printer so that its left side overhangs a supporting surface by approximately one inch (see Figure E-2).

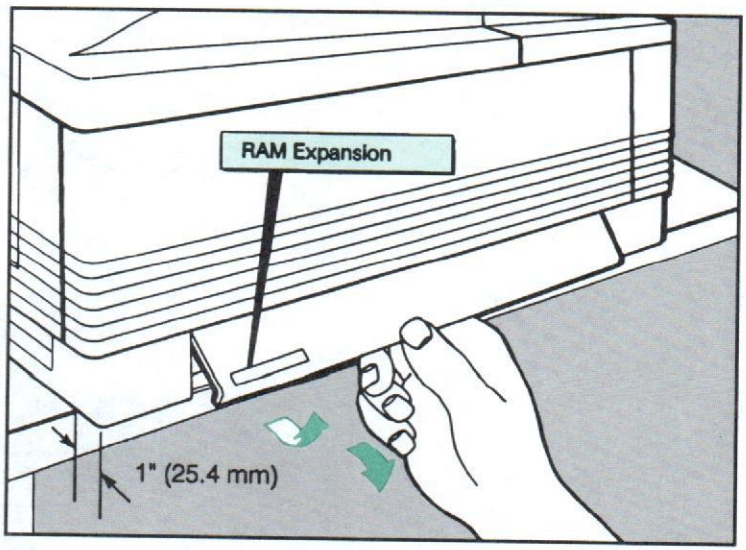


Figure E-2. Removing RAM Expansion Access Cover

Warning

The printer weighs over 50 pounds. If necessary, ask for assistance in moving it about the work area.

3. Remove the plastic RAM Expansion access cover by inserting the tip of your finger in the slot under the center of the lower edge, then pulling the plate outward and downward (see Figure E-2).

4. Loosen the three captive screws (they cannot be removed) securing the metal cover plate (see Figure E-3). Grasp the metal tab and slide the plate to the left (rear), then remove it by pulling on the tab. To discharge static electricity which could damage the board or sensitive internal printer components, maintain contact with bare sheet metal printer surfaces during installation.

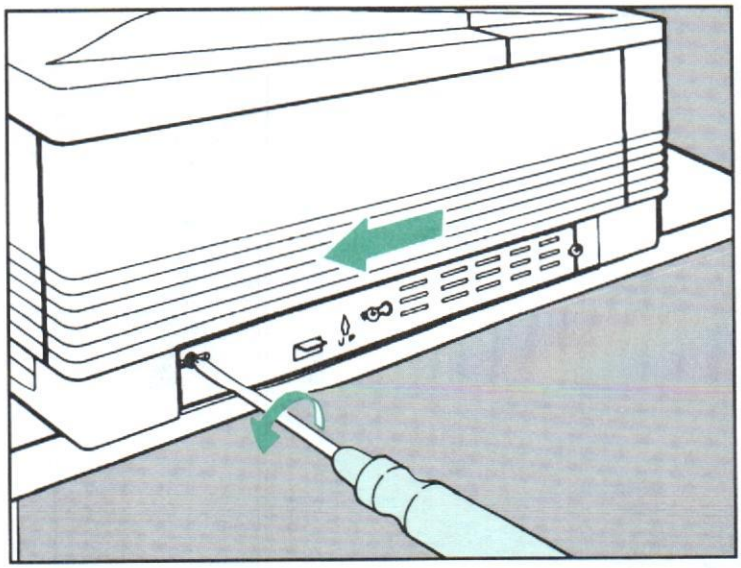


Figure E-3. Metal Cover Plate Removal

5. To install the first board, remove it from its antistatic packaging (be sure to follow antistatic procedures previously mentioned) and hold it with the surface to which the components are attached *up*. Slide the board into the printer using the slot guide rails (see Figure E-4). Be sure the board is within the guide rails.

Note

Although a single board may be installed in either the forward or rear slot, the forward slot is suggested for the first board.

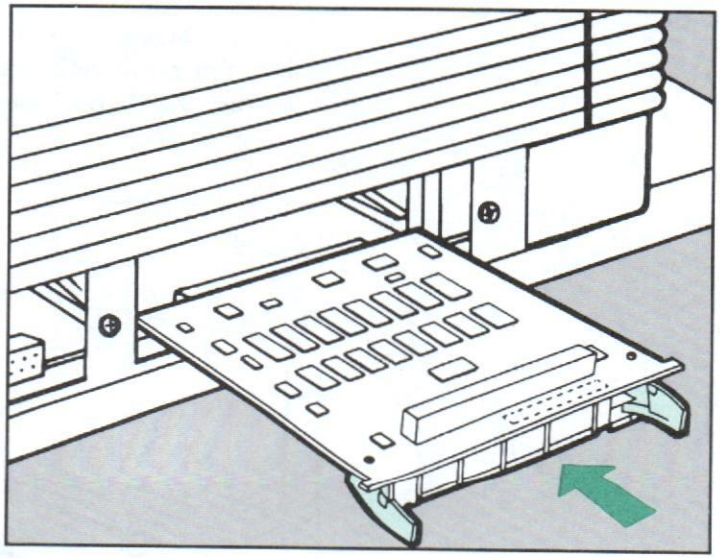


Figure E-4. Installing a Board

6. To fully seat the board, hold the printer with your free hand, then **firmly** push against the board's flat green plastic area (see Figure E-5).

7. If a second board is to be installed, insert it into the empty slot in the same manner. Be sure to **firmly** push against the green plastic area to properly seat the board's pin connector as described in step 6.

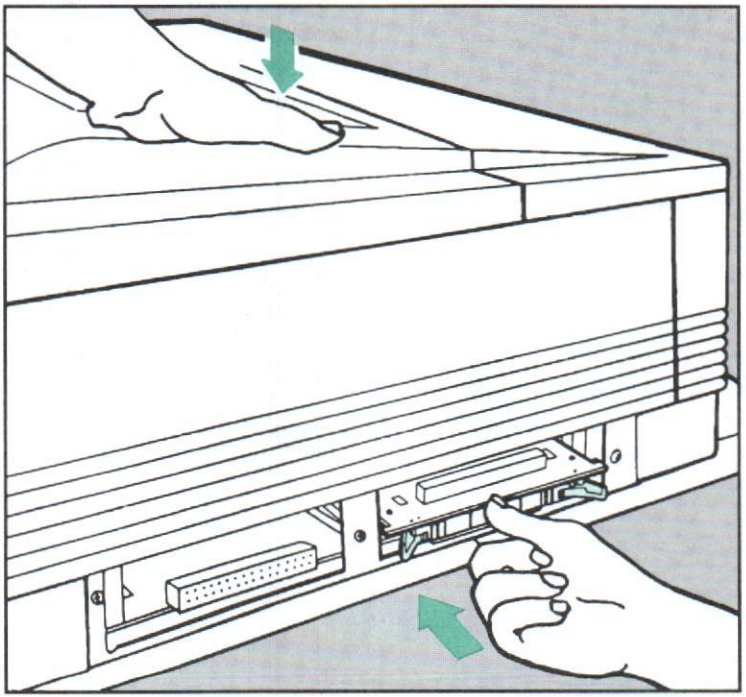


Figure E-5. Seating Board

8. To replace the metal cover plate, first place the left slot behind the left screw, then align the center slot over the center screw and push in until the plate is flush with the base. Next, slide the plate to the right as far as possible (until the right-most screw is engaged), and tighten the three screws. Replace the plastic cover.

Test Installed Board

- With the power switch OFF, plug in the power cord, then switch the printer ON. (Depending upon the amount of installed memory, the printer may take up to 55 seconds to reach on-line status.)
- Run a 05 SELF TEST by taking the printer off line, then holding down the (PRINT FONTS/TEST) key until 05 SELF TEST is displayed (about three seconds). When the printing portion of the test begins, 06 PRINTING TEST will be displayed. If the board is operating correctly, the self-test printout will show one of the RAM size messages in the Self-Test Message Table below.

SELF-TEST MESSAGE TABLE

Forward slot	Rear slot	RAM Size Message
1 M	None	RAM size: 2048K bytes
2 M	None	RAM size: 3072K bytes
1 M	1 M	RAM size: 3072K bytes
2 M	1 M	RAM size: 4096K bytes
1 M	2 M	RAM size: 4096K bytes
2 M	2 M	RAM size: 5120K bytes

In Case of Difficulty

If RAM size is incorrectly reported, repeat steps 1 through 8, checking to be sure the memory board pin connectors are **firmly** seated. The following error messages may appear:

- `53-1 ERRORUNIT` or `53-2 ERRORUNIT`: Indicates an error on a RAM expansion board. The number following the dash indicates which expansion board failed (1 indicates the board in the right (front) slot, 2 the left (rear) slot). If this error appears, notify Hewlett-Packard or your authorized dealer for assistance. (The user may resume printing by clicking the Continue key.)
- `57-1 ERRORUNIT` or `57-2 ERRORUNIT`: Indicates that more than four megabytes of expanded memory have been installed. The extra memory, in one megabyte increments, in the indicated slot (1 or 2) will be ignored, but up to four megabytes total will be used. To resume printing, click the Continue key.
- `63 SERVICE ERROR`: If this message appears, a board may be defective or incorrectly installed. First, attempt to clear the error by switching the printer off and then on again. If this does not clear the error, switch the printer OFF and check to be sure the board is seated properly. If this error still appears, notify Hewlett-Packard or your authorized dealer for assistance.

Memory Board Removal

To remove a board, first access it by repeating steps 2 through 4 in the "Install the Board" section. Then unseat it (see Figure E-6) by squeezing the green tabs together while pulling toward you. Place the board in antistatic packaging.

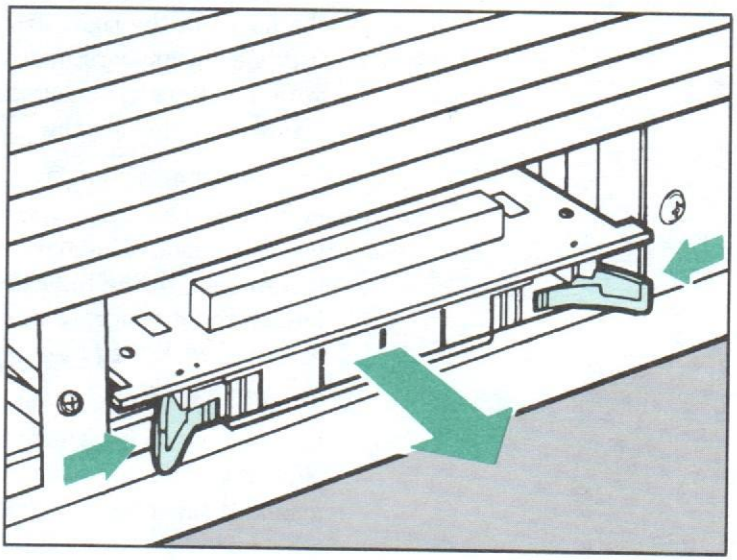


Figure E-6. Removing Board

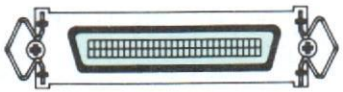
F

Interfaces

The LaserJet III printer supports an RS-232-C serial interface, an RS-422A differential serial interface, and a Centronics parallel interface. The back of the printer has two connectors, parallel and serial, allowing you to connect one of the three interfaces.

Use the control panel Configuration Menu to configure the interface. The printer stores configuration information in non-volatile RAM, which means the printer saves the configuration even if you turn off the printer. For more detailed information, see the *LaserJet III Printer Technical Reference Manual.*

Parallel Interface



To configure your printer for parallel I/O operation, use the Configuration Menu and the instructions in *Your Guide to Setting Up Your LaserJet III Printer.* When you configure your printer for parallel operation, you can send data to the printer using the Centronics parallel communication protocol. Table F-1 lists the signals and pin designations used for parallel communication. For more detailed information, see the *LaserJet III Printer Technical Reference Manual.*

Table F-1.
Parallel Interface Connector Pin Assignments.

Signal	Pin	Pin	Signal
-Strobe (Input)	1	19	Strobe Return (GND)
Data 1 (Input)	2	20	Data 1 (GND)
Data 2 (Input)	3	21	Data 2 (GND)
Data 3 (Input)	4	22	Data 3 (GND)
Data 4 (Input)	5	23	Data 4 (GND)
Data 5 (Input)	6	24	Data 5 (GND)
Data 6 (Input)	7	25	Data 6 (GND)
Data 7 (Input)	8	26	Data 7 (GND)
Data 8 (Input)	9	27	Data 8 (GND)
-Acknlg (Output)	10	28	Acknlg Return (GND)
Busy (Output)	11	29	Busy Return (GND)
Paper error (Output)	12	30	Signal GND
Select (Output)	13	31	-Input Prime (Input)
NC	14	32	-Nfault (Output)
NC	15	33	Auxout1 (Output)
O VDC	16	34	NC
Chassis GND	17	35	Auxout2 (Output)
+5 VDC (output)	18	36	NC

The dash (-) before some signals indicates that the signal is negative true (active LOW). GND means the connection is a ground. NC indicates that the pin has no connection.

Serial Interface



Use the Configuration Menu and the instructions in *Your Guide to Setting Up Your LaserJet III Printer* to configure your printer for serial I/O operation. When you configure your printer for serial operation, you transfer data to the printer using serial communication protocol. You can use either RS-232-C or RS-422A cable.

Table F-2 lists RS-232-C and RS-422A pin assignments and signal descriptions. Those pins not appearing in the table are not used.

Table F-2.
RS-232-C and RS-422A Pin Assignments and Signal Descriptions.

Pin Number	Description	RS-232-C	RS-422	I/O
1	Protective ground (shield)	I	I	-
2	Transmitted data (data from the printer)	*		Output
3	Received data (received by the printer)	*		Input
	Received data inverted (RDA) (received by printer)		*	Input
4	Request to send. This signal is HIGH whenever the printer is powered ON.	*		Output
5	Clear to send. This signal is not required for the printer to transmit flow control characters. (DC1/DC3)	*		Input
6	Data set ready. This signal is not required for the printer to receive data.	*		Input
7	Signal ground	*	*	
9	Send data inverted (SDA)		*	Output
10	Send data noninverted (SDB)		*	Output
18	Receive data noninverted (RDB)		*	Input
20	Data terminal ready. (Polarity can be set from the printer control panel. Normally set to HI. Refer to host interface specifications for polarity requirements.)	*		Output

*The asterisks identify signals that are used.

The following serial cabling schematics are typical of IBM (AT/XT) and compatible personal computers using the standard (9/25) pin serial RS-232-C interface.

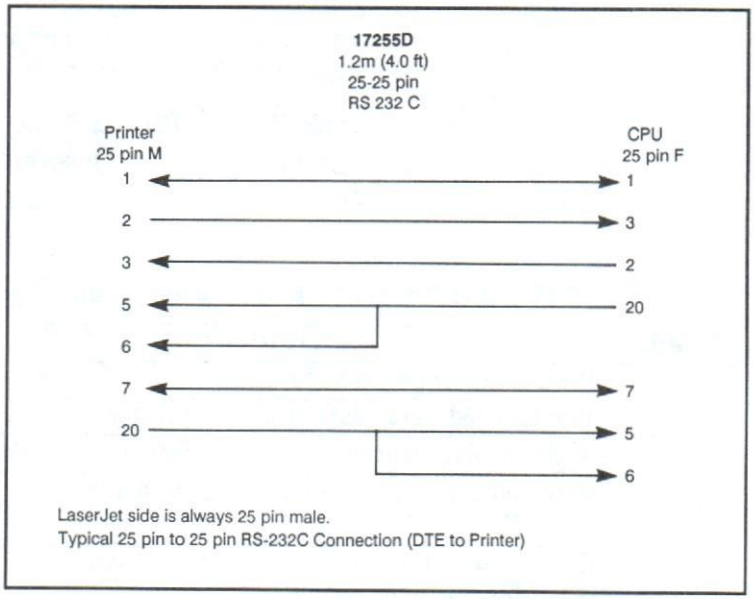


Figure F-1.
Typical PC/XT (and compatible) and PS/2 pin assignments

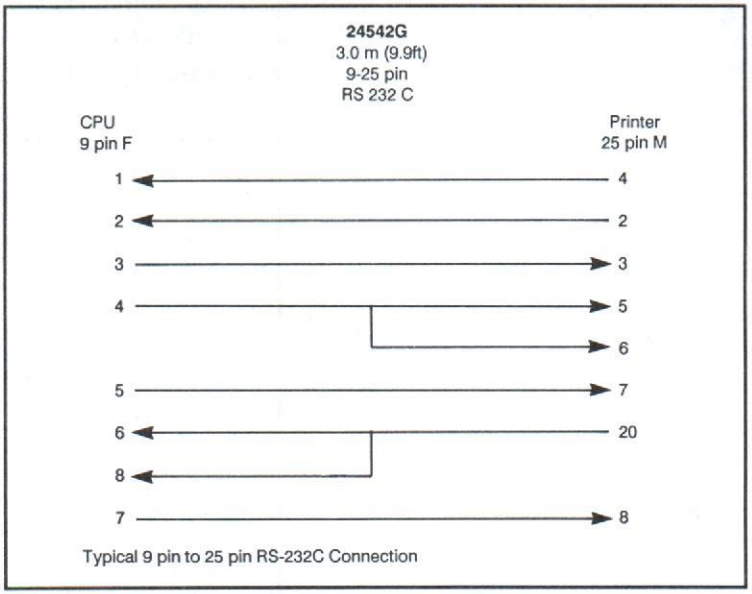


Figure F-2. Typical AT (and compatible) pin assignments

The following cabling schematic is based on an HP Vectra PC with an HP24541B RS-422A interface card installed. Your configuration may vary.

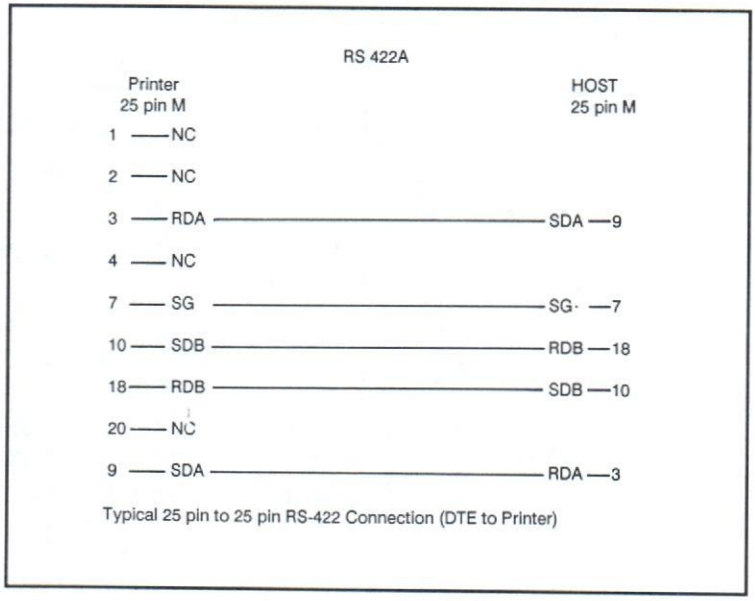


Figure F-3. Typical RS-422A 25-25 pin assignments.

Glossary

Application
A software program or group of programs for solving common business tasks, for example, Wordstar and Lotus 1-2-3.

Baud Rate
The data transfer rate between the computer and the printer. Baud rate applies only to serial interfaces.

Bitmapped Font
A particular collection of symbols with fixed character size and shape.

Configuration
The process of changing certain printer settings to allow your computer to communicate properly with the printer.

Default
A printer setting used in the absence of a software application selection.

Downloading
Transferring data from your computer to the printer.

Drivers
Files used by some applications to access printer characteristics.

Embedded Printer Commands
Printer commands written by the user directly into a software file.

Escape Sequences
Software commands to the printer. The printer distinguishes these commands from regular text by the presence of an **escape character,** a special control code.

Factory Default

The settings that are programmed into the printer at the factory. These settings are in use until you override them from the control panel or by sending printer commands.

Fixed Spacing

Uniform horizontal spacing between characters and symbols in a font. The distance from the beginning of one character to the next is exactly the same. Also called **fixed pitch.**

Font

A collection of characters and symbols. A font is described by symbol set, spacing, pitch, point size, style, stroke weight and typeface. Fonts can refer to the printer's internal fonts, or fonts stored in optional font cartridges and soft font disks.

Font Cartridge

A plug-in device containing additional fonts. Cartridges are installed in the printer so that a greater variety of fonts can be selected for printing.

Font Characteristics

The symbol set, spacing, pitch, point size, style, stroke weight, and typeface selections that determine what a printed font looks like.

Internal Fonts

The fonts resident in the printer when shipped from the factory.

Menu

A list of items presented for selection from the printer's control panel. The printer has two menus: The Printing Menu and the Configuration Menu.

Off-Line

A status during which the printer will not accept data from the computer. Some errors automatically take the printer off-line. Pressing ON LINE switches the printer between on-line and off-line. The printer is off-line any time the On Line indicator is not lit.

On-Line

The state in which the printer will accept data from the computer. The printer is on-line when the On Line indicator is lit.

Orientation

The direction of print across a page. The LaserJet III printer supports four orientations: portrait, landscape, reverse portrait, and reverse landscape.

Page Protection

Reserving a block of printer memory to prevent 21 PRINT OVERRUN errors when composing very dense or complex graphics and text.

Permanent Font

A font that resides in the printer's memory until the printer is powered off, memory is cleared, or the font is replaced via software command. (Resetting the printer does *not* clear a permanent font from memory.)

Pitch

The number of characters printed per horizontal inch. Pitch applies only to fonts with *fixed spacing.*

Point Size

The height of a font. Point size is measured from slightly above the top of uppercase letters to slightly below the bottom of lowercase descenders, such as the tail of the letter "y". There are 72 points per inch.

Printer Commands

See **Escape Sequences.**

Proportional Spacing

The proportional horizontal spacing between characters and symbols in a font. The width of each character varies.

RAM

Random Access Memory; the type of memory used by your printer to store downloaded fonts, macros, and print data.

Resolution Enhancement

A LaserJet III feature that improves the 300 dpi print quality standard.

Scalable Typeface

A *design* of characters and symbols, from which you can generate fonts of selected size and pitch.

Set-Up Strings

Embedded commands, usually for initializing the printer that precede any other print data.

Spacing

The distance between individual printed characters. All fonts have either *fixed* or *proportional* spacing.

Stroke Weight

The thickness of print of a font, for example, light, medium,and bold.

Style

The slant of a font, for example, upright (normal text) or *italic.*

Symbol Set

A unique grouping of all the available characters in a font. Each symbol set is defined with a specific set of applications in mind. For example, the LEGAL symbol set includes special characters used in the law profession.

Temporary Font

A font that resides in printer memory until you print a font list, reset the printer, power the printer off, or clear or replace it using a software command. Temporary fonts are not listed on the font printout, because they are erased when the font list is generated.

Treatment

The emphasis placed on a font, such as italic or bold. Treatment describes both style and stroke weights.

Typeface

The design aspect of fonts.

Typeface Cartridge

A cartridge containing scalable typefaces for use with the LaserJet III printer.

Typeface Family

A group of typefaces with strong design similarities, often differing only by their treatment (for example, medium, bold, italic, bold italic).

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